# Smithsonian

*July 1995*

**CRASH-TEST DUMMIES**
**Taking the hits to make our lives safer (p. 30)**

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# "We have the chance to save one of the last unspoiled ecosystems on our planet." *George Schaller*

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What A Luxury Car Should Be

*July 1995*

# Smithsonian

Volume 26, Number 4

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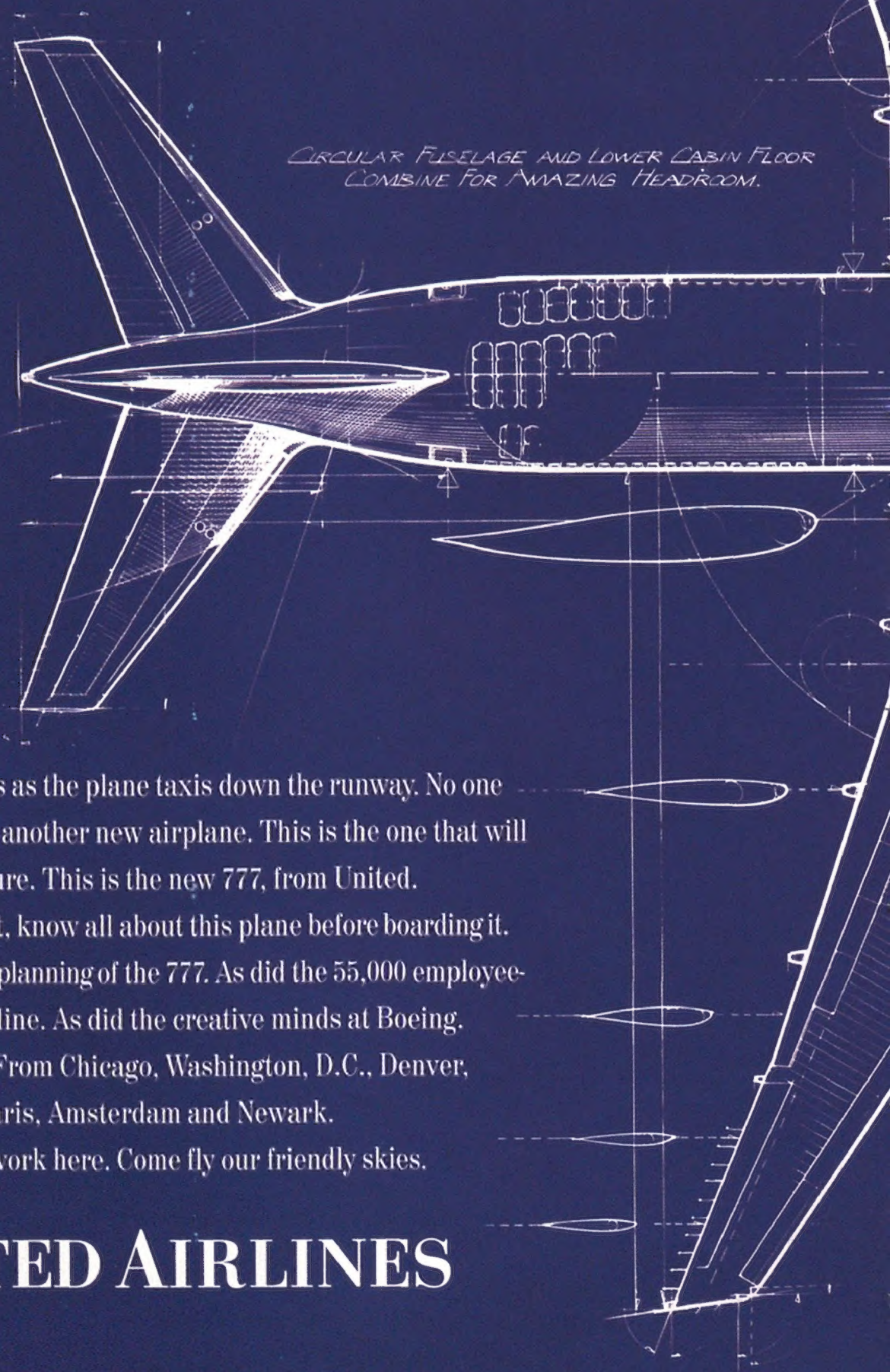


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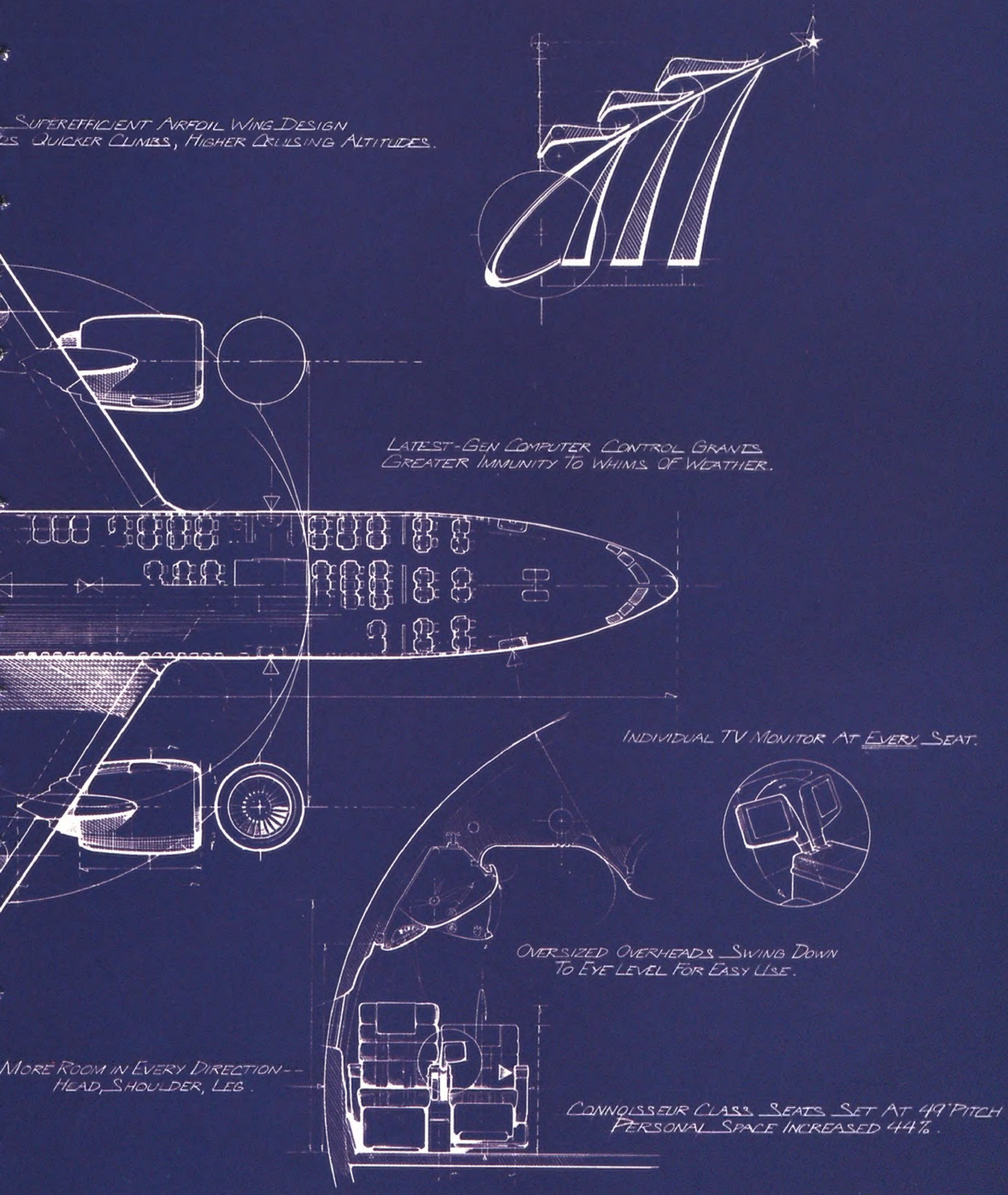


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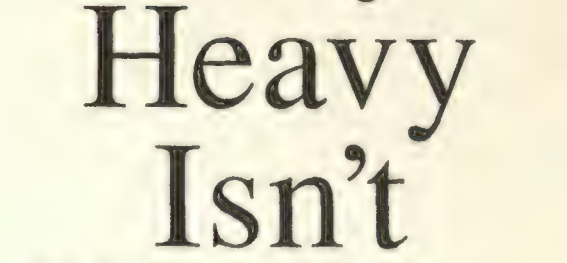

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*Secretary Heyman's comments*

# *Smithsonian Perspectives*

*As part of our 150th-anniversary celebration, we're going to take 150 museum treasures on the road*

When I took up my responsibilities as the tenth Secretary of the Smithsonian in the fall of 1994, as a longtime Californian I brought the perspective of someone who had lived most of his life far away from Washington, D.C.

As a result, I knew from experience what so many other Americans feel about this wonderful Institution. We take pride in it, we want to share its treasures with our children; but it's a long journey to Washington, whether we live more than a day's ride away or across thousands of miles. Many of us get to the Smithsonian only at one point in our lives, often when visiting with our family or classmates.

So, I decided that a principal goal as Secretary would be to make this group of museums and research centers as accessible to as many people as possible, wherever they live. Central to that strategy is my commitment to the electronic transformation of the Smithsonian, which I have written about in an earlier column. Since our home page went on-line May 8 (through the World Wide Web) with more than 20 hours of Smithsonian images and text, millions have been able to sample the Smithsonian experience whenever they want.

But most Americans do not yet have access to the information highway; and even those who can get on-line know that there is something very special about "the real thing." Enjoying first-hand the treasures we hold in trust for the American people still involves taking a trip to Washington.

I mean to change that, if only for one moment in our history.

Next year, 1996, is our 150th anniversary. I can think of no better way to celebrate the Smithsonian's birthday than to take the treasures of the Smithsonian "home" to as many regions and as many Americans as possible. During 1996 and 1997, the exhibition "America's Smithsonian," featuring some of the most historic, intriguing and beautiful objects from our history, art and science museums, will travel to 12 cities around the country, among them Los Angeles, Kansas City, Detroit and Houston.

This will be without question the Smithsonian's largest traveling exhibition ever. It may prove to be the largest that has ever toured the country. Since the exhibition will occupy 50,000 square feet, it is too large for traditional museum spaces, so we will transform convention and civic centers into exhibition halls with all the excitement (and security) of our own museums. And like visitors to the museums around the National Mall, everyone will be able to enter free of charge.

What can you expect to see on your visit to "America's Smithsonian"? Treasures from our national past, such as First Ladies' gowns, George Washington's sword, Tecumseh's tomahawk, Thomas Edison's light bulb and Amelia Earhart's flight suit; from the world of sports and entertainment, Babe Ruth's bat, Arthur Ashe's tennis racket, Dizzy Gillespie's trumpet and Dorothy's ruby slippers from *The Wizard of Oz*; from the United States and around the world, powerful works of art and valued scientific collections; from outer space, the Apollo 14 command module. There will be at least 150 treasures in all.

We also want people to feel the special excitement of a visit to the National Mall. We'll have a carousel to ride on, a performance stage, a Victorian ice cream parlor to relax in and, if we can work out the details, an amazing new way to see our Imax films. These are the joyous aspects of a visit to the Smithsonian that we want people to be able to experience in their own part of the country, until they get a chance to come visit us in the nation's capital.

Along with the objects we display will come intellectual treasures: our researchers, our educators, our specialists in all matters of conserving and displaying the objects we hold in trust and the many traditions we want to pass on to generations to come. During the six weeks that "America's Smithsonian" is in town, some of our staff will go to the schools, universities and museums that enrich each city; others will tell you what they know about objects that you bring for them to look at, or give some tips on collecting and preserving your own family's objects and memories.

To support this important effort, and other anniversary activities including television programs and a public celebration on the Mall on August 10 and 11, 1996, the Smithsonian has entered into a partners program with major U.S. corporations who share our vision. With the cooperation of the corporate world in our 150th celebration, the Smithsonian will be able to touch the lives of Americans nationwide in ways new to all of us.

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# *Letters to the Editor*

### *The Wall*

Dear Sir: The May issue of SMITHSONIAN fell open to the picture essay "Offerings at the Wall." I was a child in the 1970s and was fairly untouched by Vietnam, I had always thought.

As I read the story I cried a good, sobbing, cathartic cry. Those simple items left at the memorial so poignantly illustrate what we lost in the war: a strong, strapping piece of a generation and the guilelessness that went with it.

May we always be able to view the articles left at The Wall so we can always be reminded of the cost of war and the price of unquestioned faith in authority.
*Sue Schafer*
Parker, Colorado

Dear Sir: Although I don't have family members or friends whose names are etched in the somber black granite of the Vietnam Veterans Memorial, conflicting feelings of sorrow and pride swept through me as I slowly walked beside it. At the base of The Wall I found a pair of green Army boots and a letter addressed to their owner, a private. I searched and found his name. It was then that I realized, even though these men had fought and lost their lives in Vietnam, The Wall had brought them and their memories home.
*Damionne C. Bell*
New Orleans

### *Colonel Olcott and Madame Blavatsky*

Dear Sir: As a rather liberal minister, I may not be the pillar of traditional Christianity, but I have found the Theosophical philosophy deeply inspiring. It shows how the ancient teachings of religions from around the world have taught Man an ethical way of life and an advanced sense of his inner divinity.

Blavatsky has provided a study and a philosophy that can rescue the modern world from its overwhelming materialism, and she has given this minister reason to hope that faith in a Divine Presence and life after death are not utterly dead.

Blavatsky has done so much good for me, my colleagues and my congregation, I am saddened to see her life and memory attacked and ultimately discredited.
*John Paul Rolston*
Pinole, California

Dear Sir: In an April 1986 article in the *Journal of the Society for Psychical Research,* author Vernon Harrison concludes that the incriminating letters attributed to Madame Blavatsky in the 1885 SPR report by principal investigator Richard Hodgson are forgeries.
*John Algeo,* National President
The Theosophical Society in America
Wheaton, Illinois
*The letters in question were reportedly lost, making further examination impossible. After reading both the Hodgson report and the Harrison article, Edward Hower determined that the former still "seems convincing." A number of questions raised in the Hodgson Report remain unanswered.* Ed.

Dear Sir: The white-haired woman in the picture with Krishnamurti (below) (and mentioned in the text on page 127) is one of the more remarkable women ever and could herself be the subject of an article. She is Annie Besant (1847-1933), who abandoned her husband and the Church of England to promote atheism, graduated to Fabian socialism and Marxism, and then became a labor organizer, a magazine publisher and a powerful pioneer for birth control and women's rights.

In 1889 she read Madame Blavatsky's works and promptly became a Theosophist. Moving to India, she created the India Home Rule League and founded a Hindu college. In 1907 she was chosen president of the Theosophical Society. It was she who first promoted Krishnamurti as a "world teacher," an honor that he later rejected.
*Pamela Ropahi*
Fort Smith, Arkansas

### *Nuclear waste*

Dear Sir: I have been observing efforts to establish a means for disposing of our nation's nuclear waste for about 40 years and have concluded that those who would like to see the word "nuclear" abolished from our language have done a splendid job of obfuscating, delaying and generally harassing a program that simply has to be done—in our lifetime or beyond. Safety is never perfect. Maybe, like our national debt, we'll leave the task to our children.
*Henry G. Vermillion*
Carlsbad, California

Dear Sir: Some people say, "Not in my backyard." I am not afraid of nuclear energy or radiation. I trust the men and women, engineers and physicists alike, who design and build nuclear power plants and nuclear storage facilities. I have walked the hallways of a nuclear power plant, spoken to the people who work there and was not afraid. I was happy to see others like myself who trust nuclear power.

People ask too much when it comes to public health and safety with regard to nuclear power and radiation—I feel some regulations border on the ridiculous. I will accept them, however, for the sake of the industry and civilization as a whole.
*Anton Nelson*
Trenton, New Jersey

Dear Sir: You reported the brouhaha over how to dispose of lethal nuclear

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waste that may outlast Homo sapiens itself on a planet with errant continents that continuously bump and fracture one another. The waste, however, is not all the same: relatively little is maximally lethal and, practicably, eternal; the rest is tamer and more ephemeral.
*William F. Sheeley*
Phoenix

Dear Sir: An increasingly common error appeared in Jeff Wheelwright's otherwise excellent article. He should have written: "The exposure limit for the public living near these facilities is set *at one-fiftieth of* [not "50 times lower than"] the occupational standard."
*Fred A. Henningsen*
Missoula, Montana

Dear Sir: We wouldn't be wringing our hands about what to do with all this nuclear waste had we thought about what to do with all the deadly byproducts before we started building. The rush to build was fueled by Cold War ideology coupled with massive government subsidies. If alternative technologies had been given even a fraction of the attention, and subsidies, nobody would have perceived a need to construct nuclear power plants. In fact, such alternative energy sources can eliminate the need to build additional conventional power plants (take Pacific Gas & Electric as an example).
*Jeri D. Shepherd*
Greeley, Colorado

Dear Sir: After several million years' experience, humankind has occasionally managed to consider what today's actions may mean for the next several decades, possibly for a few generations. Having the stuff, what to do with it does need to be figured out. Should we continue to produce this offal, hoping a technological cavalry will crest the horizon?
*Michael Short*
Bellingham, Washington

Dear Sir: Please, tell me it isn't so. Tell me there was a typo, a computer error or a misplaced decimal point. The U.S. taxpayers can't be paying close to "a half-million dollars a day" to operate a hole 2,150 feet belowground. I calculate that for the past nine years we've paid roughly $1.5 billion. For a hole in the ground.
*Francis A. Hepburn*
San Diego
*Sorry, that was no typo.* Ed.

## *Bitterns*

Dear Sir: William Burt's article about trailing the least and American bitterns amused and delighted me. Early last spring I, too, encountered an American bittern, not in its normal marshy habitat but in my Evanston, Illinois, backyard where the bird wonderfully blended into the background (above).

Mr. Burt could have saved himself much discomfort had he spent a dry, warm morning bird-watching from my kitchen window.
*Judith Stoewe*
Evanston

Dear Sir: My husband and I were driving the loop at Arkansas National Wildlife Refuge when a least bittern uncharacteristically emerged from its camouflage to stroll across the road. We stopped, fascinated. The bird sensed danger and "bitterned," standing rock-still with its long, narrow beak pointed straight up to the sky, confident it mixed in perfectly with the reeds. Unfortunately, it wasn't in the reeds but in the middle of the road. We watched in delighted amazement, then slowly edged the car past the avian statue, its eyes following us down the paved Texas road. Only when we rounded a curve did it dash back to shelter.
*Mary Lee Archer*
College Station, Texas

## *Chris Evans vs. the Southern Pacific*

Dear Sir: Your article took me back 50 years to Visalia, California. When I was 10 years old, a 92-year-old boarder in our house, known simply as Grandpa Keener, regaled my sister and me with stories of the early days in Visalia, including hangings, robberies and atrocities I can't mention here. He claimed Chris Evans was a friend of his when they worked together. I clearly remember his telling us about the Mussel Slough Massacre, the train robberies and the shoot-out at Stone Corral.

I was never sure whether he was making up those stories, but Stephen Fox told them just the way Grandpa Keener did. I couldn't remember how they ended, and I am happy to know that Chris survived all the gunfights.
*Jerry Mixon*
Sedro Woolley, Washington

Dear Sir: Your article made me recall the struggle in Frank Norris' *The Octopus.* Although Norris was trying to adhere to realism, he could not resist having Shelgrim, his Collis Huntington-like villain, suffocate in a torrent of golden California grain. Unrealistic but still very satisfying.
*George P. Nye*
Wareham, Massachusetts

Dear Sir: As a 14-year veteran of the Cleveland police force, I am outraged that SMITHSONIAN has published an article that attempts to elevate a cold-blooded killer of law enforcement officers to folk-hero status. Chris Evans was unhappy with the treatment he and his neighbors received from the Southern Pacific Railroad, so he decided murder and robbery would secure lower freight rates. The logic escapes me.

Stephen Fox's description of murdered deputy sheriffs Oscar Beavers and Andy McGinnis and wounded deputy George Witty as "stupid and spineless" left me numb.

The National Law Enforcement Officers Memorial is not far from the Mall. Stone carvers have added the names of nearly 14,000 men and women killed in the line of duty, and new fatalities are added every spring. Each name represents a real person who worked to protect and serve, whether it was California in 1889 or now.
*Ignatius A. Sowa*
Cleveland

Dear Sir: You neglected to mention your March 1992 article on the great cynic, misanthrope and satirist Ambrose Bierce, whose articles in Hearst's San Francisco paper and whose trips to Washington, D.C. had more to do with

# IN SOME WOMEN, A TUMOR-SUPPRESSING GENE KNOWN AS P53 ISN'T WORKING. BUT WE ARE.

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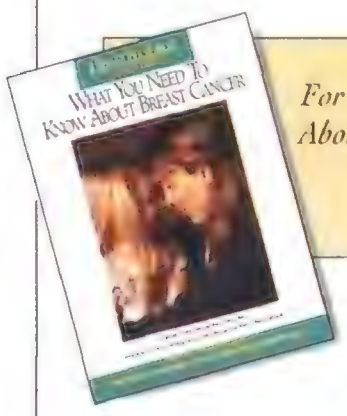


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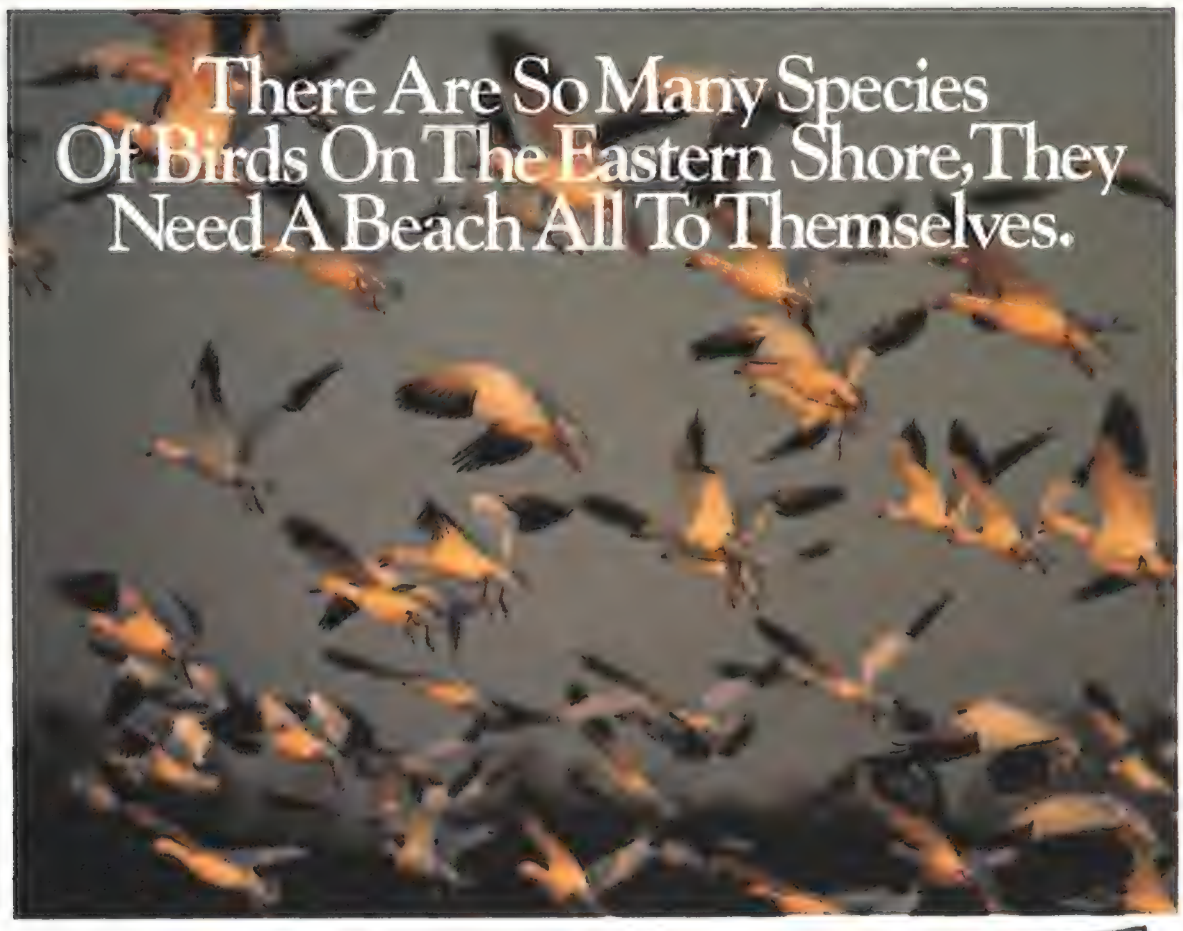


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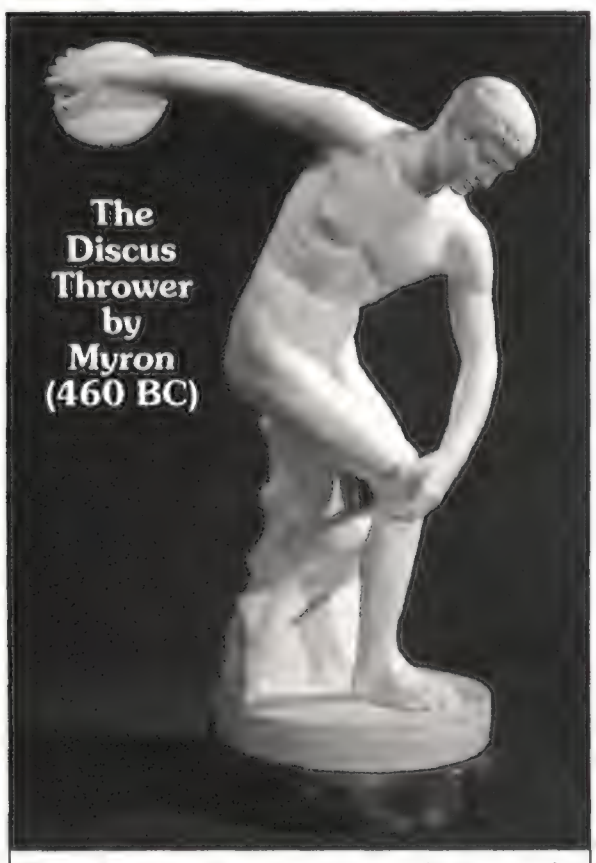


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*Alan Rosen*
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*Last Page*

Dear Sir: Gerald Dumas reminded me of a funeral service and interment I attended 50 years ago with a much younger cousin, his parents, older sisters and other relatives. Once back home in his everyday clothes, the youngster collected his teddy bear and a small shovel. He dug a hole in the backyard and very reverently placed his teddy into it while solemnly saying, "In the name of the Father and of the Son and into the hole 'e goes."
*David A. Jones*
Gainesville, Florida

Dear Sir: When my son Kester was about 3 years old, I gave him his first slice of watermelon. "Eat just the red part," I told him. "The rest is called the rind." He studied that half-moon slice for the longest time and finally looked up at me and asked, "Do I have to eat the peas, too, Daddy?"
*Bill Burns*
Sandersville, Georgia

*Around the Mall*

Dear Sir: You shaved a carat off the Hope Diamond's weight. It measures 45.52 carats. As the former curator of Smithsonian's National Mineral and Gem Collection, I should know.
*John S. White*
Stewartstown, Pennsylvania

Dear Sir: Edward P. Henderson's story about the Hope Diamond represents only his recollection of the events surrounding Evalyn Walsh McLean's death. An oral history preserves such stories and may be apocryphal. The many myths about the diamond are part of the Hope's fascination.
*Pamela Henson*
Institutional History Division
Office of Smithsonian Archives
*Reader Edgar H. Brenner, who has researched the matter, says that when Mrs. McLean died, the banks in Washington, D.C. were closed for the weekend and their vaults locked until Monday morning. FBI Director J. Edgar Hoover permitted the storage of a cigar box containing the Hope Diamond and other McLean jewels inside an FBI safe.* Ed.

# Around the Mall and Beyond

*By Michael Kernan*

*The Smithsonian Associates have a 'national treasure' in their midst, but shhh, don't tell. It's already hard enough to get a seat on the bus for one of Ed Bearss' battle-site Study Tours*

He has groupies who wear special "Bearss Brigade" badges on the tours. He has people who have ridden with him 40 times or more. He has couples who first met on the bus, got engaged and then invited him to their wedding and he went. He will talk for 12 hours straight on one of his Civil War field trips, and then during the lunch break his class of Smithsonian Associates—his friends and fans—will spend the whole time talking about him.

"Ed Bearss is a national treasure," says one Associate on a one-day tour that I've joined. We are following the path of James Ewell Brown (Jeb) Stuart in the days leading up to the Battle of Gettysburg. The young and flamboyant cavalry commander had made a disastrous end run around the Union Army, literally an ego trip that may well have cost the Confederates America's most celebrated battle.

Edwin Cole Bearss, of the National Park Service, has been running tours to battle sites of the Civil War, plus a few of the Revolution and of the War of 1812, for the NPS since 1955. He was their chief historian for 13 years and now serves, at age 72, as the director's special assistant for military sites.

Our first stop is Rowser's Ford on the Potomac River, where the 39 of us stand by the canal lock and hear how Stuart brought his 6,000 troopers across the river during high water, hand-carrying shells and using up most of the night at a time when speed was essential.

Before long we are all transported back to 1863. It is the end of June and Gen. Robert E. Lee is moving north to invade Pennsylvania. He absolutely must know where the Union Army is: Is it still twiddling its thumbs in Virginia or coming after him into Maryland?

On the morning of June 25 Jeb Stuart's plans to ride around the Union Army are foiled when he encounters Union troops on the very road he intended to use. A courier is dispatched to warn Lee that the Union Army is on the move, but the courier never makes it. Now, because the Yankees occupy the road, Stuart must first ride farther south and east before heading north. For a full week, Stuart's cavalry remains cut off from the Army of the Potomac, and Lee is deprived of intelligence he desperately needs.

Our bus speeds past the pompous mansions in the ritzy Washington, D.C. suburb of Potomac and then through the modest Maryland countryside above Olney, but Bearss makes us see instead Jeb Stuart's column: horsemen trotting in fours, a line ten miles long including 125 forage wagons Stuart has captured, plus ambulances, ordnance wagons and artillery. "He has orders to disrupt the enemy's movement and collect supplies," Bearrs tells us; "this, he does, but it shows poor judgment, because he forgets that his primary mission is to move as rapidly as possible and to reestablish contact with Lee's army once he knows the Union Army is across the Potomac."

Stopping at Westminster, Union Mills and other points—there are to be close to a dozen during the day—we debark and gather around our leader as he paces back and forth in our midst, eyes mostly closed, silver-knobbed Royal Marine swagger stick under his arm, drawing the picture. Full names of generals, colonels, even captains; verbatim dialogue; shrewd analysis of his characters'


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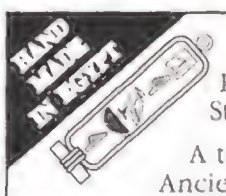

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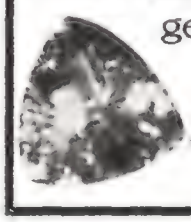
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# The Wonder of Iron-3

*Some of the most beautiful sounds of iron are the chime of wind bells and the melodic bowing of the cello.*

## The Sound of Iron

*By Tomoyuki Kohara*

For many, the term "metallic sound" connotes discomfort, disharmony, fear and stress. When we speak of the sound produced by iron, many people think of the harsh noises emanating from ironworks and construction sites.

In suspense and thriller movies, metallic sounds are used very effectively to create an atmosphere of tension and increase the sense of anticipation, making the moviegoers edgy and excited. The hard, shrill sounds produced by iron and other metals are also indispensable elements for conveying the mental stress and discord felt by movie heroes and heroines during tension-packed scenes.

On the other hand, there are also many iron sounds with pleasant associations. Iron is a major element in the music produced by many popular musical instruments.

Pianos, mandolins, violas and steel guitars all use the vibration of steel strings resonating with the instrument to create beautiful sounds. Glockenspiels and steel drums can produce a wide range of sounds. The glockenspiel covers three octaves using steel plate cut to different lengths for each note in the scale. Triangles, cymbals and bells make good use of the metallic sound of steel although they cannot individually form a melody.

The sound of Japanese wind bells can be defined in this way. Apart from the occasional typhoon, Japan experiences only light winds from early summer to the beginning of fall, so to many Japanese, the sound of wind bells elicits memories of cooling summer breezes. According to Japanese aesthetics, the refined, natural sounds of the wind are highly valued, so perhaps this is the reason wind bells sound so pleasant. Unfortunately, for Westerners staying at Japanese country inns, the bells may actually intrude on their peaceful enjoyment of a different Japan.

*About the Author:*
*Tomoyuki Kohara is a science journalist who is interested in the materials of the life sciences, global environment, and ecosystems. He earned a master's degree from Hokkaido University in piscatology.*

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mental state; even gestures recorded in someone's memoirs: Bearss goes on like this all day, nonstop, and never glances at his notes.

I know a fair amount about the Civil War, but this is all new to me. How the excessively gentle Lee, when Stuart finally reports to him at 2 P.M. on July 2, long after his army had blindly blundered into battle at Gettysburg, actually raised a fist as if to strike the man who was supposed to be his "eyes and ears." How on July 3, at Gettysburg, George Custer, only six days a general, charged at the head of his adopted Michigan cavalry with the yell, "Come on, you Wolverines!" How the Grass Hotel at Hunterstown, Pennsylvania (a private house now), used to look, and which wounded soldier was treated by which Army surgeon there, and what his wound was, and how it looked, and how the surgeon treated it. . . In Hanover, Pennsylvania, we visit the site where a man fell into a tanning vat (Bearss reports his name, rank and middle initial—Lt. Col. William H. Payne, 2d North Carolina Cavalry) and the site of the silver maple tree under which Custer tied his horse.

This was amazing material. But for me the best part of the day was the way Bearss' regulars clustered around to tell me about him. After lunch at the Altland House in Abbottstown, Pennsylvania, I got an earful.

"You hear about the Mud March?" asked Gary Carpenter of Silver Spring, Maryland, a Bearss trooper since 1985. I knew of the Union Army's infamous aborted winter march after Fredericksburg, but this was rather more recent. It seems in early March one wet spring, Bearss walked his group over the open ground of Pickett's Charge at Gettysburg. "It was so soggy that people sank to their ankles. One woman lost her shoes. We'll never forget that day."

There was the time the bus broke down at Cold Harbor, Virginia, and during the six-hour wait for a replacement the group sent out for pizza and beer and had a walloping party.

There was the time the bus got stuck in a ditch at Fishers Hill, and local farmers brought out pots of coffee. Another time the bus stalled on the railroad tracks at Manassas, and neighbors called the railroad to stop the soon-due train.

That all happened before Paulie Ward became Bearss' permanent bus driver two years ago. "Last year we were down in the Fredericksburg area and

Historian Ed Bearss, swagger stick in hand, leads his "troops" on a field trip.

Ed said, 'Paulie, I want to go see this house,' and he pointed down in the woods where there was nothing but two tracks in the dirt. So I took it down in there; the bus was tilting, the trees were scraping the windows. I said, 'Ed, we going to be able to turn this bus around?' No problem. We got down within a hundred yards of that house, I turned her around and got out and joined the tour." You can bet that Paulie Ward knows a fair bit now about what Ed Bearss knows.

"Don't encourage people to discover him," pleaded Paul Davis, a Washington native who discovered Bearss two years ago. "As it is, you have to sign up two months in advance."

Once Bearss lost his trademark swagger stick down a storm drain, and George Evans of Annandale, Virginia, and Paul Sposito of nearby Springfield rescued it with coat hangers.

"We love him," Sposito said simply. "We have badges showing we were at his 70th and 71st birthday parties." Oh yes, the fans help him celebrate every June 26, wherever the tour may be.

"You don't bring things to read on Ed's trips," remarked George Stevens of Alexandria, Virginia, whose wife Roberta was the volunteer in charge of us all, counting heads after every stop. She's a special assistant in cultural affairs at the Library of Congress.

And then there was that time at Little Round Top, the climax of Gettysburg

Day Two, when Bearss was lecturing atop a large bare rock and hundreds of tourists joined the group to listen.

"The whole hillside was covered with people," someone said. "It was like the Sermon on the Mount."

Well. Not to carry this too far, but suffice it to say that Edwin C. Bearss is a very special sort of historian.

Born in Billings, Montana, he was raised on a ranch 40 miles from Hardin and a bike ride away from the Little Bighorn battlefield.

"But I got interested in the Civil War in the seventh grade. My father was a marine in World War I. He liked to read aloud, war books. Then I got a biography of Jeb Stuart and that was it."

He named the cattle on his father's ranch after generals and battles, his favorite cow being "Antietam." In World War II he signed up as a marine, of course. PFC Bearss fought at Guadalcanal and New Britain, where he suffered gunshot wounds to the left arm and foot, right shoulder and back. He was 26 months in the hospital. After his discharge in 1946 he took a B.S. degree in foreign service at Georgetown University and later took his M.A. in history at Indiana University with a thesis on Gen. Pat Cleburne, "the Stonewall Jackson of the West."

"When I was at Indiana University," he said, "I visited Cleburne's battle sites, Shiloh and Stones River, and the historian at Shiloh spent the day with me. I like Shiloh: it looks the way it did, not so many monuments, and you can feel alone out there, 80 miles from anywhere."

In 1955 he took a Park Service job as park historian at Vicksburg, transferring 11 years later to Washington. While at Vicksburg he did the research that led to the recovery of the Union gunboat *Cairo*, long lost in the Yazoo River. He also found two forgotten forts and helped make Grand Gulf in Mississippi, the site of a Civil War engagement, into a state military monument.

"I gave my first tour for the Smithsonian in October 1977. They didn't do much with tours then. I did Antietam and must have had good reports, because they wanted me to continue."

The next year he gave a tour of Gettysburg, out and back from Washington in one day. "The restaurant took two hours to serve us. We were really late."

Now Bearss takes six days and three separate tours to cover Gettysburg: one for the preliminaries at Brandy Station and elsewhere, one for Stuart's gallivanting ride, one for Lee's retreat and three for the days of the battle itself.

He appears on television (in the Ken Burns *Civil War* series, for one) and lectures to Civil War round tables and writes books, 14 to date, ranging from monographs to 1,200-page, three-volume histories. He has another one coming out this summer, on events of 1862 on the James River. He and his wife, Margie, have three children: Edwin jr., a marine; Mary Virginia, a former marine; Sara Beth, a historian.

One detail he had mentioned—the fact that horses usually don't urinate on the run, preferring to stop, which was yet another reason for Stuart's slow progress—stuck in my mind. I asked Bearss where this bit of arcanum had come from, expecting a technical reference to some history of warfare.

"Oh, I used to ride six miles home from school, and I was always in a terrible hurry because I didn't want to miss my radio programs, *Little Orphan Annie, Tom Mix, Terry and the Pirates.* That's when you learn that speed counts."

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# *The Object at Hand*

*By Bil Gilbert*

*A great Shawnee warrior and statesman, Tecumseh united Western tribes in 1812 to fight the encroaching settlers. He lost the war and his life but is much honored in our history*

The sculpture *The Dying Tecumseh*, in the National Museum of American Art, is highly stylized to conform to artistic notions of a classical hero.

At the end of a long gallery in the Smithsonian's National Museum of American Art there is a ton of marble that, after nearly 20 years of intermittent work, was completed in 1856 by Frederick Pettrich, a German-born, Italian-trained sculptor. The subject is a reclining, heroically proportioned man whose dignified and noble demeanor is unaffected by a bullet hole in the right temple. If the wound and a tomahawk held in the right hand are overlooked, the figure could be that of one of the champions of classical legend—an expiring Hector or Siegfried—who so engaged romantic artists of 19th-century Europe. In fact, the gleaming white sculpture is entitled *The Dying Tecumseh*, but any resemblance to the mortal Shawnee leader of that name is entirely coincidental. He died in battle and was disfigured by enemy soldiers 25 years before Pettrich began this work. While alive he posed for no known portrait. Nevertheless it is singularly appropriate that this is an imaginary figure, for no one else of Tecumseh's race and few of any other have had such a powerful and abiding impact on the collective American imagination.

The real Tecumseh was born circa 1768 in southern Ohio at the beginning of a sporadic but ferociously fought war that did not end until—and largely because—he was killed in 1813. In this conflict his Shawnee, the Miami, the Potawatomi and other nations of the Great Lakes and Ohio Valley region sought to defend themselves against the white settlers pioneering westward across the Appalachians.

Tecumseh was a warrior at 15; later he became a renowned field commander and a charismatic orator. By the early 1800s he had conceived of a Pan-Indian federation. In this union he hoped old tribal rivalries would be set aside so that the indigenous people of the Great Lakes and Mississippi Valley could act as one in resisting the advancing whites. From a base on the Tippecanoe River in northern Indiana, he traveled from Canada to the Gulf of Mexico promoting this federation. His ambition was probably an impossible one; the Indian population of this territory was then less than 100,000 and that of the United States nearly seven million. Still, rumors of what he was up to greatly alarmed many frontier whites, including William Henry Harrison, the federal governor of the Indiana Territory. Formerly a Regular Army officer, Harrison negotiated with Tecumseh face-to-face on two occasions and assessed him as "one of those uncommon geniuses who spring up occasionally to produce revolutions and overturn the established order of things."

In the fall of 1811 Harrison gathered a thousand men and, when Tecumseh was away, made a preemptive strike against his base on the Tippecanoe. After a brief fight several hundred garrison warriors withdrew from the village. The so-called Battle of Tippecanoe was, in effect, the first engagement of the War of 1812. In that war Tecumseh fought alongside the British because, unlike the Americans, they were not invading Indian lands. In August 1812 Tecumseh, leading a multitribal group of warriors, and a combined force of Canadian militia and British regulars surrounded Detroit. Fearing imminent massacre by "hordes of howling savages," the aging and ailing Brig. Gen. William Hull surrendered Detroit and his 2,000-man army (SMITHSONIAN, January 1994).

Tecumseh's warriors soon struck deep into the United States, attacking forts and sending terrified settlers fleeing back toward the Ohio River. Harrison, called back to command U.S. forces in the West, spent nearly a year converting militiamen into passable professional soldiers. In the fall of 1813 he invaded Ontario. The British general, Henry Procter, retreated in panic. Fighting almost continuously for five days, Tecumseh and 600 warriors screened the British retreat, but on October 5 Harrison caught up with Procter at the Thames River near Moraviantown. The British general ignominiously fled; after a single American vol-

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ley all his regular troops surrendered. Tecumseh meanwhile positioned his exhausted men in a patch of swampy woodland and told them he would retreat no farther. Having finished the British, Harrison sent dragoons and infantry into these thickets. After an hour of fierce fighting Tecumseh was killed, or presumably so. At least he was never again seen alive. For all practical purposes the Indian resistance movement ended in the Northwest. But the process that led to the *Dying Tecumseh* sculpture had already commenced.

The first year of the War of 1812 was a humiliating one for the United States. The nation's political and military leaders badly needed a gaudy victory to restore public morale and their own reputations. Not much could be done with the wretched General Procter. But the defeated Indians were another matter. The first battle reports—later embellished in bloody detail—claimed Harrison's brave boys had overcome 3,000 superb warriors led by the great Tecumseh. Naturally the public was eager to know which American hero had brought down this mighty Shawnee champion. Satisfying that curiosity was—and still is—complicated by what might be called the habeus corpus problem.

Warriors who survived the battle told various stories. They had been forced to leave Tecumseh's body on the field. They had carried him off, either mortally wounded or dead, and buried him in a secret place that whites would never find. As for the Americans, none of those who first overran Tecumseh's position were acquainted with him. But they found an impressive-looking dead Indian who they were convinced was Tecumseh. Some cut strips of skin from this body, later tanning them for razor strops and leather souvenirs. When people arrived who did know him, some said the battered corpse was indeed Tecumseh's. Others said it was not. Even Harrison could not positively identify it.

Nevertheless a number of Americans were to claim that they had personally vanquished the Shawnee leader. Most prominent was Richard Johnson, a Kentucky politician who fought at the Thames as a cavalry commander. Whether or not he was indeed "The Man Who Killed Tecumseh," a great many of his constituents believed he was. With supporters chanting "Rump-

sey Dumpsey, Rumpsey Dumpsey, Colonel Johnson killed Tecumseh," Johnson was first elected to the U.S. Senate and then, in 1836, to the Vice Presidency. With a little help from another catchy jingle, "Tippecanoe and Tyler Too," William Henry Harrison became President four years later.

Frederick Pettrich began work on *The Dying Tecumseh* in 1837, doubtless much influenced by these political happenings. This was certainly the case with John Dorival, who in 1833 painted the immensely popular *Battle of the Thames.* In the foreground of an extremely busy battle scene, Johnson and Tecumseh are engaged in hand-to-hand combat. The former brandishes a pistol, sports a dragoon's tall stovepipe hat adorned with an ostrich plume and sits astride a splendid white charger. Tecumseh, on foot, appears to be about seven feet tall, overtopping Johnson's rearing horse. He wears a flowing headdress fabricated from the plumage of at least four or five eagles. Lithographic prints of Dorival's work were purchased and widely distributed by managers of Johnson's Vice Presidential campaign. Other paintings of this battle, quite similar in heroic detail and inaccuracy, came to decorate many a 19th-century barbershop and barroom.

For reasons of obvious self-interest the conquerors of Tecumseh eulogized him first as a "red Hannibal-Napoleon" and then as a man of preternatural sagacity, courage and honor. Typically, the *Indiana Centinel*, published in Vincennes, editorialized: "Every schoolboy in the Union now knows that Tecumseh was a great man. His greatness was his own, unassisted by science or education. As a statesman, warrior and patriot, we shall not look on his like again."

A decade or so after his death Tecumseh had become The Noble—in fact the noblest—Savage. Towns, businesses and children—William Tecumseh Sherman, for one—were named for him. In my own youth, growing up in southern Michigan 30 miles to the west of the village of Tecumseh, it was still widely believed that his was the face that appeared on the "Indian Head" penny. I later learned that the model for this coin was the daughter of a U.S. Mint engraver, but legend generally overrides fact. In addition to sculptures, paintings, woodcuts and other pictographic works, hundreds and probably thousands of articles and books, occasional epic poems and dramas about Tecumseh have appeared since his death. And they continue. Tecumseh literature is now more voluminous than that devoted to William Henry Harrison or Richard Johnson, and nearly all of it is laudatory. Except for Robert E. Lee, *sans peur et sans reproche*, no other declared enemy of the United States has been so well regarded for so long as has Tecumseh. Praise for noble enemies—once they are safely out of the way—is part of a long heroic tradition. But with the passage of time the enduring interest in and admiration for Tecumseh has raised a question that has become more troublesome for many Americans. It is: "If Tecumseh and his cause were so noble, why was he killed and mutilated?"

With this in mind it has occurred to me that the sculpture in the National Museum of American Art, the most massive of the many memorials to the man, could be retitled *Tecumseh's Revenge.*

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*Queen Elizabeth 2*

# *Smithsonian Highlights*

## Planning a Smithsonian Visit?

Receive a special free Associates' Planning Packet. Write Smithsonian Information, Smithsonian Institution, Washington, D.C. 20560, or call (202) 357-2700, daily, 9 A.M.- 4 P.M.; for callers with communication impairments, TTY: (202) 357-1729. *Note:* Parking near Smithsonian museums is limited. The Metrorail subway system has parking available at some stations (details in packet).

Begin your visit at the Smithsonian Information Center's Associates' Reception Desk—open 9 A.M.- 4 P.M. daily—in the Castle.

## Extended Summer Hours

The American History, Natural History and Air and Space museums are operating on extended hours daily, 10 A.M.- 6:30 P.M., through Labor Day, Monday, September 4. Hours at the National Zoo are 9 A.M.- 4:30 P.M. daily for buildings and 8 A.M.- 8 P.M. for grounds, through October 15. Other Smithsonian museums are generally open 10 A.M.- 5:30 P.M. daily, except December 25.

## Festival of American Folklife

The 29th annual Smithsonian Festival of American Folklife is being held on the Mall, June 23-27 and June 30-July 4, from 11 A.M. to 5:30 P.M., with a dance party from 5:30 to 7 P.M. and a concert from 7 to 9 P.M., daily. This year's festival features American Indian women's traditions, the heritage of the Czech Republic and Czech-Americans, music of Russian-American immigrants and the culture of the Cape Verdean community.

## Special July Exhibits, Events

### Arts and Industries Building

*The Harmon and Harriet Kelley Collection of African American Art* (through July 30) Paintings, watercolors, graphic works. See *Highlights Continued*, page 26.

### National Air and Space Museum

*Building the Arsenal of Democracy: World War II Photographs from the National Air and Space Museum Archives* (through October 2) Efforts on the home front.
*Beyond the Limits: Flight Enters the Computer Age* Major gallery explores the computer revolution in aerospace.

### National Museum of Natural History

*Ocean Planet* (through January 1, 1996) The causes and consequences of environmental threats to the world's oceans.
*The Royal Tombs of Sipan* (through September 4) The Pre-Columbian Moche civilization of Peru.
*Gem and Mineral Hall* Closed until December 1996. The Hope Diamond is on view on the second floor of the Rotunda.

### National Zoological Park

*Pollinarium* (opens July 21) Permanent exhibition examines the means of plant reproduction.
*Amazonia* Permanent display re-creates microcosm of world's largest rain forest.

### National Museum of American History

*Science in American Life* Permanent exhibition tracks advances and discoveries in science over the past 125 years.
*World War II GI: The American Soldier's Experience* Permanent exhibit takes a firsthand look at the U.S. military.

### National Postal Museum

Located next to Union Station on Capitol Hill, the new museum presents exhibitions tracing the history of the nation's mail service.

### Freer Gallery of Art

*Whistler & Japan* (through January 1, 1996) Paintings, drawings and prints done during the 1860s and '70s.
*On the River* (through January 1, 1996) Hanging scrolls, panels, handscrolls, album leaves and fans illustrate everyday life along a river in China.

### Arthur M. Sackler Gallery

*Painted Prayers* (July 23-April 7, 1996) Photographs by Stephen P. Huyler document colorful ritual paintings executed by Indian women. See page 94.

### National Museum of African Art

*The Ancient West African City of Benin, A.D. 1300-1897* (reopens July 26) Royal court art from the kingdom of Benin.
*The Ancient Nubian City of Kerma, 2500-1500 B.C.* (opens July 26) Loan exhibit from the Museum of Fine Arts, Boston.

### Hirshhorn Museum & Sculpture Garden

*Directions: Martin Kippenberger* (July 20-October 22) Collages and satirical drawings by the German mixed-media artist.
*Sean Scully: Twenty Years, 1976-1995* (through September 10) Retrospective showcases the abstract imagery of the Irish-born American painter.

### National Portrait Gallery

*The Passionate Observer: Photographs by Carl Van Vechten* (through August 13) Images document the leading creative artists of Van Vechten's time (1880-1964).

### National Museum of American Art

*Gene Davis in Black and White: Drawings from the Fifties and Eighties* (July 14-January 7, 1996) Works by the celebrated Washington "Color Painter."
*The White House Collection of American Crafts* (through September 4) A unique collection of contemporary crafts.

### Renwick Gallery

*Recent Acquisitions* (through October 1) Exhibit includes Michael Taylor's glass sculpture *Selenium Ruby* (1994).

### Anacostia Museum

*Black Mosaic: Community, Race and Ethnicity Among Black Immigrants in Washington, D.C.* (through August 31) Oral histories, art, photographs and other materials reveal cultural diversity.

### Heye Center, National Museum of the American Indian (New York)

*Creation's Journey: Masterworks of Native American Identity and Belief* (runs indefinitely) First of three inaugural exhibitions features 165 objects dating from 3200 B.C. to the present.

### Cooper-Hewitt, National Design Museum (New York)

*Kitsch to Corbusier: Wallpaper from the 1950s* (through August 20) Designers include such artists as Le Corbusier, Joan Miró and Henri Matisse.

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*Highlights Continued*

# A kaleidoscope of black culture

In the winter of 1986-87, Harmon and Harriet Kelley of San Antonio, Texas, saw an exhibition of art that catapulted them into the world of collecting. The show was "Hidden Heritage: Afro-American Art, 1800-1950," a touring exhibit that had come to the San Antonio Museum of Art. "We were so impressed, we went back several times," says Harriet Kelley. "After each visit, we came away with greater appreciation and a stronger desire to begin our own collection."

That desire became a resolve that grew into one of the country's finest holdings of African-American art. Selections from this collection are now on display at the Smithsonian's Arts and Industries Building through July 30. Organized by the San Antonio Museum of Art and presented by the Smithsonian's National African American Museum Project, "The Harmon and Harriet Kelley Collection of African American Art" surveys the work of leading artists from 1800 to the present. Diverse and eclectic, the exhibition features more than 120 works by such prominent artists as Romare Bearden, Elizabeth Catlett, James VanDerZee and Jacob Lawrence.

"Harmon and Harriet Kelley's collection presents a kaleidoscopic view of black life and cultural history," says Corrine Jennings, an expert on African-American art. "It is a collection of great character and vision."

*Diane M. Bolz*

At left, painterly, modernist style of Laura Wheeling Waring's *Still Life with Heather* (1927) reflects influence of her studies in Paris. Romare Bearden's *Jazz Movement* (1946) signals his transition from social realism to abstraction.

*The Checker Players* (1985) by John Coleman is rich in realism and satire. Direct, naive style aptly captures artist's childhood memories of the South. Social realist Jacob Lawrence rendered gouache titled *Strong Man* (right) in 1951.

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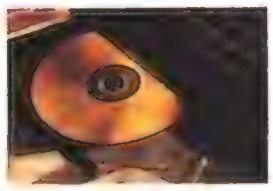
( *Francis Ford* ) **Coppola's pad**



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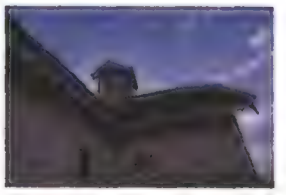

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*By Richard Wolkomir*

# Sitting in our stead: crash dummies take the hard knocks for all of us

*In the quest to create safer cars, researchers subject high-tech humanoids to everything from head-on collisions to nasty sideswipes*

Using study aids like this mold of an actual human skull (opposite), Tom Terry, director of crash evaluations at GM, and colleagues have focused on anatomy to make state-of-the-art dummies like the mannequin at his side.

Tom Terry, director of crash evaluations for General Motors, holds up a head. It is from a crash-test dummy, an aluminum-and-vinyl replicated human head. Terry contemplates it, assuming the "Alas, poor Yorick" position. "It weighs ten pounds," he says. "In an automobile crash, because of the forces at work, your body parts may weigh 20 times normal, so this head would be 200 pounds—you couldn't control where it went."

That is why carmakers like General Motors stock up on extra dummy heads. Also spare arms, torsos, legs and feet. Sometimes—in the line of duty—the dummies get a bit under the weather. In fact, Terry is standing in the dummy hospital at GM's Milford Proving Grounds, near Detroit. Dummies come here after a hard day at the office, to get fixed up. Seven of them are now sitting on chairs along the wall, heads slumped, like a forlorn family in an emergency room after a disaster.

First in line is the "50th Percentile Male," an average Joe of 5 feet 8 and 170 pounds. Right now, after riding cars into walls all day, he is suffering from "sick sensors": the transducers buried at key points in his head and body need recalibration. That is what ails the entire family, including the "5th Percentile Female," who is small enough to serve also as a teenager. Her forehead's plastic skin is bruised. Slumped beside her is the "95th Percentile Male," a big guy built like a linebacker. His leg is crooked. All three wear pink tights to give them correct friction on the car seat, so that when their Chevy or Oldsmobile crumples against a barrier they will slide around just as we would. Most pathetic are the kids, in assorted sizes—ages 6 months, 1, 3 and 6 years. Child labor laws do not apply to dummies.

It is OK to anthropomorphize crash-test dummies because anthropomorphism is what they do: they are our stunt doubles. They repeatedly crash into walls to show what would happen to us. GM engineers say 30 percent of their crashes are to make sure new cars meet federal safety regulations. The rest are to work out bugs in prototype cars or equipment.

It is anything but cheap thrills. Each instrumented dummy costs nearly $100,000. Every year GM alone perpetrates about 500 intentional car collisions. Other manufacturers demolish their cars, too. They also employ crash "sleds" that help researchers understand how vehicle interiors can be made even safer. Dummies are simulacra of us, their proportions exact, their transducers analogous to our nerves. They are, as one engineer puts it, "injury-measuring devices." They are just machines. But they look so much like us it is upsetting to see them take our hits.

*Photographs by Brad Trent*

In Warren, Michigan, at GM's university-like Research and Development Center, a dummy called SID sits on a sled. "SID" stands for "side-impact dummy," a specialist in sideways crashes into other cars. SID's sensors measure the forces that such a broadside crash exerts on a human body.

"A crash test with a real car is the first level of simulation," says GM physicist Stephen Rouhana. "A sled like this is one abstraction further—it allows us to simplify dramatically what goes on and still get respectable data." Rouhana is in the HYGE Test Area to watch SID take his lumps. ("HYGE" stands for "hydraulic-controlled gas-energized," which describes how the sled operates.) A hydraulic ram shoots out from a 100-ton concrete block to give the sled a 3,000-pounds-per-square-inch punch. In response, the sled accelerates down 120-foot-long rails, rocketing from zero to 30 mph in six one-hundredths of a second. "That's a hundred times faster than a Corvette can accelerate," says Rouhana.

The actual test lasts just an eye blink. After that, the sled is merely rolling to a stop. This morning's test is to help develop a new air bag for side crashes. And so the sled is rigged with a car door and window. Nylon sacks represent the experimental air bag. SID sits on a simulated car seat, sideways to the waiting ram. He is bathed in high-intensity light for the benefit of high-speed video cameras on the sidelines and the sled's two on-board movie cameras. SID looks like a screen actor on a set. In fact, white-coated technicians are applying "makeup"—red chalk that will leave marks where SID's head and torso strike the simulated air bag. "He is an average male, with a below-average-male IQ," notes Rouhana.

SID sits as placidly as Forrest Gump, a thick umbilical cord of wires issuing tail-like from the seat of his tights. During the crash, 31 continuous measurements from SID's interior sensors will rush simultaneously through a cable into a waiting computer. The computer will record an incoming stream of data 4,000 times during the two-fifths-of-a-second measurement interlude.

SID is bald, his affable face faintly smiling. "He's blissful, as in ignorance," says Rouhana. That is just as well. Better that SID is unaware his feet have been removed: in previous tests they stuck to the floor and slightly slowed the speed at which he whammed into the door. Also, SID might feel deprived if he knew he had no arms, which would get in the way. Yet, his designers did not omit arms in their calculations. "The mass of the arms he doesn't have is incorporated into his rib cage," says Rouhana.

Technicians are now using blood-red laser beams to position the dummy. It must sit exactly the same in test after test. Red flashers signal that pressure is building in the ram. Technicians and the test's engineer, Bonnie Cheung, hurry behind a Plexiglas shield as the ram's operator, in a control booth above the concrete slab, conducts the countdown. Wham!

The sled rockets down the tracks. SID jerks sideways. The researchers ignore him. They hover around a video screen for an instant replay. "He was into the bag in about ten milliseconds," a technician announces. In the sled, stopped halfway down the track, SID lies sprawled, butt up, his head on the laboratory floor where it smacked. The researchers are studying a computer screen displaying the forces on SID's body at impact. Eventually they will note precisely where the red chalk from SID's head and torso marked the simulated air bag. But now the fallen SID lies unnoticed, the ultimate blue-collar worker, unprotected by OSHA, suffering in silence. Even his fellow dummies ignore him. They sit in chairs alongside the track, staring into space, awaiting their own turns on the sled.

Their world is Darwinian. The dummy's ecological niche is car smackups. Data from the crashes may lead to new designs. Accident statistics can change. Federal rules are altered. In response to all these factors, dummies mutate. It is survival of the most sensitive, the dummy whose instruments and physical reactions best

GM senior supervisor Joe Balser is flanked by dummy developed to study side-impact injuries (left) and Hybrid III, used to analyze front and rear crashes.

At GM labs, engineer Bonnie Cheung and physicist Stephen Rouhana position a Hybrid III dummy (average male size) for a rear-impact crash test. Lasers (shown in red) are used to demarcate exact placement of dummy.

mimic a human's. And so dummies are evolving to be more like us.

The wearing of seat belts in cars with air bags now reduces a driver's risk of death in a crash by 47 percent. But today's belts and bags were designed for frontal impacts, and standard test dummies were instrumented for front-end crashes. Since federal regulators and carmakers are now scrutinizing side impacts, they need SID, who sprang into being in the 1970s at the National Highway Traffic Safety Administration's behest.

In creating SID, designers at the University of Michigan plucked off a standard dummy's arms to prevent flailing, which could throw off measurements in a side crash. They made up for the lost mass by adding weights to SID's spine and ribs. He has steel ribs covered with a vinyl-graphite composite to simulate the response of human ribs to a whacking from the side. In a crash, SID's sensors measure his sideways acceleration. SID is currently the federal standard for ensuring that new cars meet side-impact crashworthiness regulations. However, SID and his clones are now like Neanderthals facing more-advanced Cro-Magnons.

*Crash dummies, taking our hits*

General Motors Corporation

During GM's 10,000th crash test, a Chevrolet Cavalier carrying a dummy passenger crashes into wall at 35 mph.

The first challenger was the more sophisticated EuroSID, from government laboratories in Europe. But U.S. automakers say EuroSID's chest is too rigid. And so GM researchers, working with the industry-wide Society of Automotive Engineers, created the even more refined BioSID, or "Biofidelic Side Impact Dummy." "Biofidelic" means "close mimicry of the human body." And biofidelity has won BioSID many auto industry fans, who hope the new dummy will replace SID as the federal standard. As Steve Rouhana puts it: "With BioSID, you can compute the viscous criterion."

The viscous criterion is a formula developed by GM researchers. It can exploit BioSID's keener sensors and biofidelic body to better portray a side collision. The formula accounts for how much, and how fast, a body compresses on impact. The more rapidly tissues compress, the more they stiffen and become vulnerable to damage. According to industry experts, SID's relatively crude instruments mainly reveal what a crash does to his bones. BioSID, on the other hand, can give a better reading on the overall risk of internal organ injury.

In dummydom, such sensitivity is what test pilots call the right stuff. But the first modern, instrumented dummies, which came along just after World War II as test-pilot stand-ins, didn't have much stuff at all.

In the beginning there was Parachute Man. That was in the late 1940s, when jet fighters first appeared. Crash-test dummies were needed to test ejection seats, but the early dummy designers had no knowledge of how to build a human simulacrum. And so they started with rulers. "One guy went around measuring people—how long is a femur?" says H. L. (Bud) Mertz, a GM expert on biomechanics and safety restraint development.

Mertz is reminiscing with his longtime Milford Proving Grounds associate Tom Terry. The early ejection-seat dummies, they point out, were basically steel barrels with limbs and heads. It was the auto industry, starting in the 1950s, that started the dummies evolving.

With enactment of the National Highway Traffic Safety Act of 1966, dummy evolution took off. Now the engineers were working on seat belts and air bags, which exerted complicated forces on a body. GM took the lead in 1971, creating the Hybrid I dummy, which GM made available to the entire industry, a practice it has continued. By 1976 researchers had produced the sophisticated Hybrid III, which will be the standard federal dummy after September 1, 1997, although it is already widely used. It is the most humanlike dummy so far, with major exceptions: Hybrid III's designers omitted ears, eyes, nose and mouth. As physicist Steve Rouhana puts it: "At even 30 miles per hour, if you hit the windshield, your nose disappears anyway."

Except for their blank faces, Hybrid IIIs come from the factory fully loaded. At GM's ATD Lab ("ATD" stands for "Anthropomorphic Test Device," officialese for "dummy") senior supervisor Joseph Balser shows off the

*After visiting GM labs to research this story, writer Richard Wolkomir reports that he is "very, very careful" to adjust shoulder and seat belts properly.*

Safety features, including air bags, seat belts and a collapsible steering column, met federal regulations.

Hybrid III 50th Percentile Male. "Its head decelerates when it hits the steering wheel, and it has three accelerometers inside its head to measure that deceleration in three directions," says Balser, adding that the readings show what the crash would do to a human's head.

Balser gazes paternally at Hybrid III. If you press the dummy's forehead, it feels oddly human, like skin over a skull. However, Hybrid III is only a highly sensitive machine. Sensors in its neck (it moves just like ours), in its steel, vinyl-graphite-layered ribs (they deflect just like ours) and on down in its lower legs, measure everything from impact on the pelvis to knee shear and loading on the tibia, sending the data to computers.

Safety engineers are studying "submarining"—wear your lap belt too high and you may slide under it at impact, possibly injuring your abdomen. To work out anti-submarining belt designs, engineers gave Hybrid III a styrofoam abdominal insert: how much it crushes reveals the potential injuries to a human.

Hybrid III is still evolving. For one thing, seat belts and air bags have reduced fatalities and upper-body injuries, with serious head injuries down substantially. So researchers are looking at other dangers, like leg injuries. "We're designing knee restraints; this may require more leg instrumentation in the dummies," says Bud Mertz.

Such refinements must be meticulous. Tom Terry displays a Hybrid III steel pelvis. "It's important to get the geometry of the load-bearing bones right; to design this pelvis we went to the University of Michigan and measured pelvic size on a bunch of skeletons," he says. Mertz and Terry recall dummy design's Paleozoic Era, when they both were graduate students at Wayne State University, a center for such studies. The stumbling block was that nobody really knew how a human body would respond to ejection-seat or car-crash forces. And so, many researchers got on sleds and tested themselves.

*Scientists at our service*

"My major professor volunteered for everything, so we'd instrument him and put him on an impact sled," says Tom Terry. "You'd start at very low forces and work up in discrete increments, to keep in the safe zone." In the unsafe zone, the scientists manned the sleds with cadavers, using bodies willed to research. These days bioengineers also visit trauma clinics to learn from actual accident victims, while some cadaver research continues at universities. So do volunteer studies. When GM researcher Annette Irwin helped develop a child dummy that would have accurate shoulder movements, she measured her own kids.

Still, dummies remain mere contraptions. At First Technology Safety Systems, in Plymouth, Michigan, where the 90 workers manufacture most of the world's crash-test dummies—about 300 a year—you can watch dummies take shape from blocks of steel, aluminum and plastic goo. "Now, here they're making a clavicle," says Gordon Morgan, director of quality assurance. "We x-ray the part to check the porosity of the aluminum bones to make sure they don't break prematurely in a crash." Other workers are brewing skin from liquid polyvinyl chloride plastic. After the plastic bakes into skin of correct thickness, grinding disks and hot irons make it smooth. "Now we're developing a facial skin that shows lacerations and abrasions," says Morgan.

At First Technology it is perpetual Halloween. Benches are strewn with feet and hands. Here are the bones of the neck being molded together, the metal vertebrae separated by rubber disks. And over here, like something from a discarded Stephen King first draft, is a dummy's disembodied behind, inscribed with quality-control graffiti: "Poor cosmetics," "Bad surface," "No bumps." Beside it is a head with a message scribbled across the chin: "Bad!"

And here is a finished Hybrid III supine in its coffin-like shipping box, flanked by its unassembled legs. It might be a Neolithic burial. But this dummy is actually just starting its macho career.

Engineers Mike Wolanin (top) and Les Noblett set up test to assess force exerted when an air bag opens into the neck of a driver who has been leaning far forward over the steering wheel.

It may become a G.I. "The military is developing a new pilot trainer, and they need dummies in order to design a cockpit that fits the largest male pilot and also the smallest female," says First Technology vice president Thomas Gutwald. There is also "Lifeman," a dummy designed to get shot so researchers can gauge the wound's impact. Our military buys dummies to test helicopters. Gutwald shows a video of two dummies riding in a five-ton Army truck at Fort A. P. Hill in Virginia. Beneath the truck a land mine is detonated. Once the flame and smoke clear, the seats—and their dummy occupants—remain in place and untouched by shrapnel. The new floor armor and wheel-well deflectors seem to be working.

Meanwhile, dummies also are at work in the civilian world. The Federal Aviation Administration uses crash-test dummies to evaluate airliner seats. And one First Technology dummy is an eyeglass-testing head. "It wears glasses, and you shoot balls at it," says Gordon Morgan.

Still, with about 20 million car crashes per year in the United States alone, automotive testing remains the most promising career for dummies. Many tests are to make sure that new cars meet federal standards. For those measurements to be accurate, each dummy's sensors must be precisely calibrated. That means the dummies must regularly undergo nasty physicals, including boppings in the chest with a 51.5-pound pendulum. Their knees get smashed with federally specified weights. They also have their heads dropped 14 inches to smack onto a table. "The head hits with about 2,000 pounds of pressure on the forehead," says Joe Balser.

All that is just to make sure the dummies' sensors and physical responses are right. The actual testing can be even more fiendish. In one lab at the Milford Proving Grounds a giant bungee-cord slingshot shoots a pair of dummy knees into an instrument panel. "Or you can put just a head in an impact device and hit it at any angle you like," says Tom Terry benevolently.

A Society for the Prevention of Cruelty to Dummies would be steamed. But it's torture in good causes. For instance, in the Out-of-Position Occupant Testing Laboratory at the Milford Proving Grounds, engineer Michael Wolanin is trying to improve air bags. In a crash, riders sitting slumped forward on their seats can be too close to an air bag when it unfurls. Wolanin is trying to redesign the air bags to protect such out-of-position riders. He points out that to be effective, bags must unfold rapidly—almost explosively. And they must be firm enough to restrain an occupant whose body weight is increased to 60 times normal by the crash forces. "We like to use the 5th Percentile Female because a smaller person is more vulnerable," says Wolanin.

He is testing a new air bag—already available in some GM cars—that detects when the driver is slumped against the wheel. Instead of unfurling through the air bag compartment's main doors, the bag unfurls through alternate side doors, so that it will not explode directly against the driver's chest, possibly crushing it. To perfect the system, Wolanin's dummies are taking a lot of hits. Electronically, they tell how bad it hurts. "The dummy has told us it's very important how we fold the bag," Wolanin says. "We've developed a new way of folding the bag so that it can shoot out the alternate doors, and the dummies are testing the various fold patterns."

Designers also are working on an air bag that unfurls

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At First Technology workshops, technician Saundra Rhea-Rogers puts finishing touches on a crash-dummy head; completed dummies (below) await shipment.

from a chamber recessed below the steering wheel to preclude the driver's chest from coming too close. At the moment, he has hoisted a female dummy nearly to the ceiling, dangling it above a steering wheel. He is in a control room, where red warning lights flash. Bright camera lights come on. When the countdown reaches zero, the dummy plunges toward the steering wheel at 12 mph. Just before the dummy hits, the air bag housed in the steering wheel bursts open, and the falling dummy is engulfed in a cloud of cornstarch, used as a lubricant in the bag. Wolanin studies a video replay.

On the screen, the dummy's breasts are hitting the steering wheel in slow motion. As the air bag erupts, the dummy's neck bends backward frighteningly. "It's just below the threshold of breaking a neck," he says, checking a readout. (The problem, he says, is that some motorists believe air bags mean they can eschew seat belts. But lap and shoulder belts cut crash deaths by 42 percent, while the addition of air bags adds only another 9 percent of protection. And seat belts keep car occupants from lurching too close to an unfurling air bag.) "We have many thousands of benign deployments for every one of these, and if you wear seat belts it will almost *never* happen," says Wolanin. "But, still, why not make the air bags a little better?"

The dummies are willing. In fact, they have already helped. The U.S. fatality rate is about 40,000 per year, a disturbing figure. Yet, according to GM physicist Leonard Evans, author of *Traffic Safety And The Driver*, a standard work, traffic statistics reveal good news too. "The number of deaths per mile of travel is now more than 90 percent lower than it was in 1922," he says, citing, among other factors, government regulation, improved occupant protection and more-crashworthy cars.

As crash statistics shift, dummies continue to evolve. "The dummies used today were designed for unbelted drivers, and we sense that today's dummies are no longer sophisticated enough for today's situation," says Ian Lau, GM's head of automotive safety and health research. He says seat belts and air bags are doing so well at protecting motorists from catastrophic upper-body injuries that safety engineers are now noticing how floor pans deform in crashes and cause disabling lower-leg injuries. "So we're beginning to design better lower-leg responses for dummies." Not long ago, the researchers added skin to dummies' necks because inflating air bags were getting into their neck vertebrae.

Dummies become ever more like us. One is even pregnant. David Viano, a GM biomechanics expert, and Dr. Mark Pearlman, a University of Michigan gynecologist, teamed up to produce the expectant dummy, causing them some bemusement. "I've been asked, 'How did that dummy get pregnant?'" says Pearlman. "And whether Vince or Larry, the dummies in Department of Transportation safety commercials, did it."

In fact, Viano and Pearlman did it, no easy task. The project began in 1992. Pearlman had, in 1984, treated a woman who had lost her unborn child in a minor car accident. He joined forces with Viano to design a seat-belt system that would better accommodate expectant mothers, since automobile accidents may terminate as many as 4,000 pregnancies each year in the United States. That meant developing a pregnant Hybrid III dummy to test experimental belt designs. Another question to address is how air bags will affect pregnant women.

Viano and Pearlman are still perfecting their seven-months-pregnant dummy. Right now the vinyl fetus, with the correct weight and consistency, has an abstract, cloudlike shape because they have to fit instruments inside. To emulate the amniotic fluid surrounding the fetus they hit upon a gel. They intend to study the effects of a car crash on a pregnant woman because the

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force of the impact can cause the placenta to separate from the uterus, killing the fetus and possibly the mother as well. While Viano and Pearlman perfect their dummy, they advise pregnant women to wear seat belts with the shoulder harness passing between the breasts and with the lap belt low, under the protruding abdomen. "Our long-term goal is to redesign cars," says Viano. "Our short-term goal is better behavior." Eventually, the expectant dummy will join the rest of the Hybrid III family in smashups at the Milford Proving Grounds.

Anita Hess, who manages Milford's Safety Test Laboratory, checks preparations for such a test one afternoon in a cavernous room that could be a space shuttle hangar. To one side sit dummy retirees, including the 1946 Parachute Man, as if contemplating their grandchildren's travails. Technicians work on a metallic blue Chevrolet Silverado pickup truck, not due in showrooms for a couple of years. A 50th Percentile Male Hybrid III sits at the wheel, wearing his seat belt. The truck will hit a steel-and-plywood barrier at 30 mph. The aim is to make sure the truck's air bag and windshield match federal safety regulations. Anita Hess watches from a control room, where buttons are flashing red, green and amber, and switches fill the surface of an intimidating console bearing labels like "Tension System Ready" and "System Armed."

It ends as it always does, in a split second, with a bang. The truck crumples. The dummy bounces alarmingly, face into the air bag. It has already sent its data to the computers. Now it will go to the hospital, removed by a crane and carted away in a wooden wheelchair. After recalibration, it will be ready for another smashup. Eventually, these dummies may lose their jobs. Engineers are now testing on-screen computer dummies that crash virtual cars in the cyberworld. "Someday," says GM engineer Annette Irwin, "we may have a model human on the computer instead of a crash dummy, with a heart and lungs and all the other vital organs."

Far off, the goal is cars that sense who is sitting in them and adjust their safety features accordingly. Meanwhile, crash testing is still a job for a dummy. David Viano once saw an Italian translation: "Hybrid III Stupido." Stupid they may be. But they also are our loyal simulacra, taking our hits. And at the Milford Proving Grounds, after work in the evening, they sit in a long row as if communally nursing their aches.

"On Friday nights I'm often the last one out of here," says Anita Hess, eyeing the line of dummies sitting in the dark. "I still have trouble walking down that row—they're kind of eerie."

As day ends at GM safety test lab, engineer Kadie Davis surveys repaired dummies, ready for the next crash.

3
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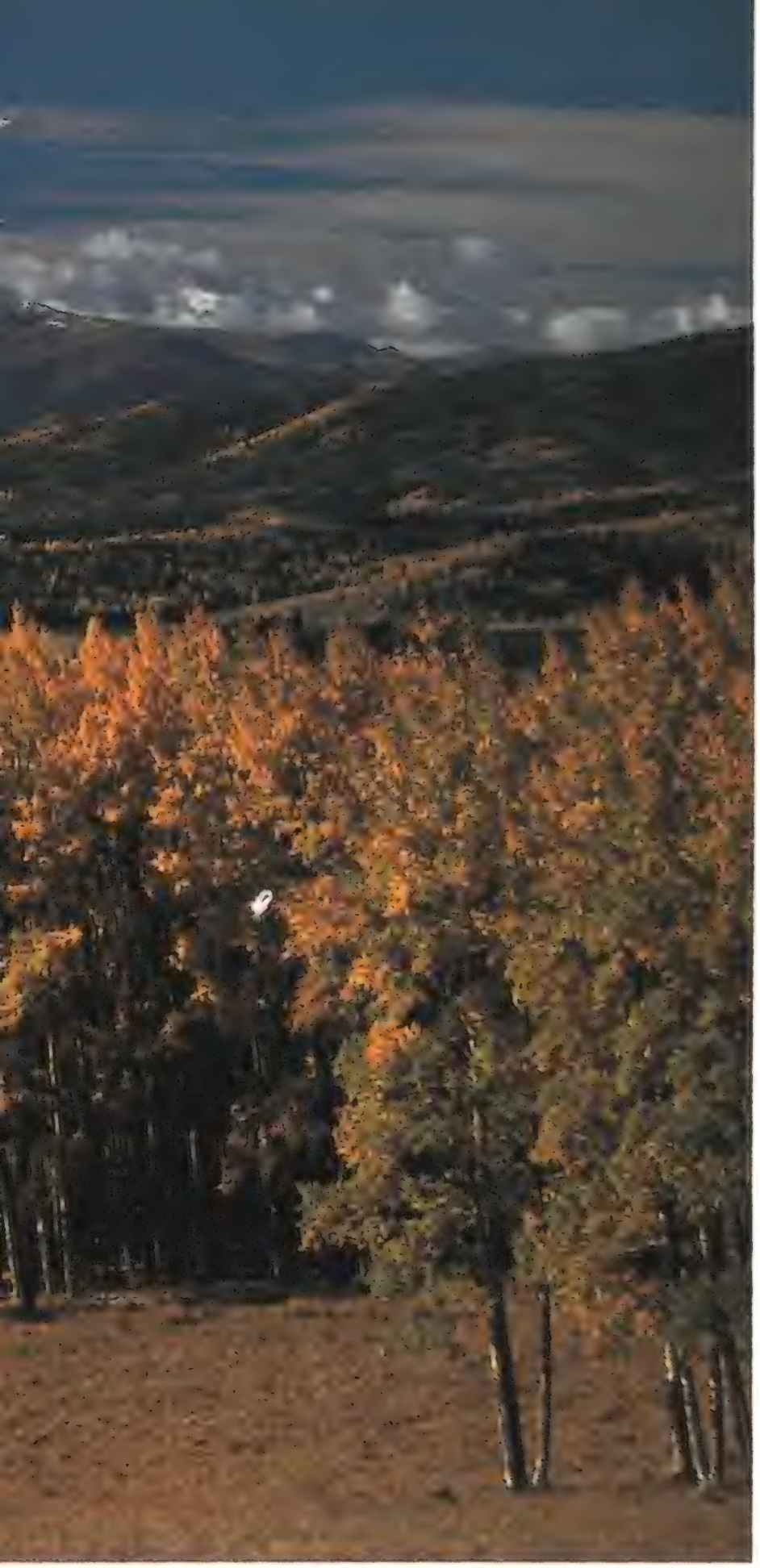
*By John Neary*

# It's hard to believe one man held sway over all of this land

*But it's true. In the mid-1800s Lucien Maxwell, a dauntless former mountain man, ruled a huge chunk of New Mexico and lower Colorado*



Peaks of Sangre de Christo Mountains palisade what was western edge of Maxwell's two-million-acre empire.

In all fairness to Lucien Bonaparte Maxwell, it ought to be stated at the outset that he was never seen wearing a crown, was never heard to say he wanted one, never insisted that his subjects call him "Your Majesty" and never, to anybody's knowledge, anyway, referred to his domain as a kingdom. But Lucien Maxwell was every inch a king, and for a while his boundless property was in fact if not in name a kingdom, a realm where the ruler's word was fiat, plain and simple.

Surely if any place on Earth was ever fit for a king, it was Maxwell's huge piece of upper New Mexico and lower Colorado. Breathtaking mountainscapes, beckoning valleys and canyons loaded with gold, streams teeming with fish, hillsides alive with game—all of it was set against a fabulous backdrop of thunderstorms, blizzards, elegant sunsets and sparkling dawns and, most important, that sense of brooding mystery and danger so essential to any topnotch kingdom. Ironic it is, therefore, that this man who embodied power, who so loved company that his castle was always open to travelers, who knew just about everybody there was to know in the Old West, is now all but forgotten.

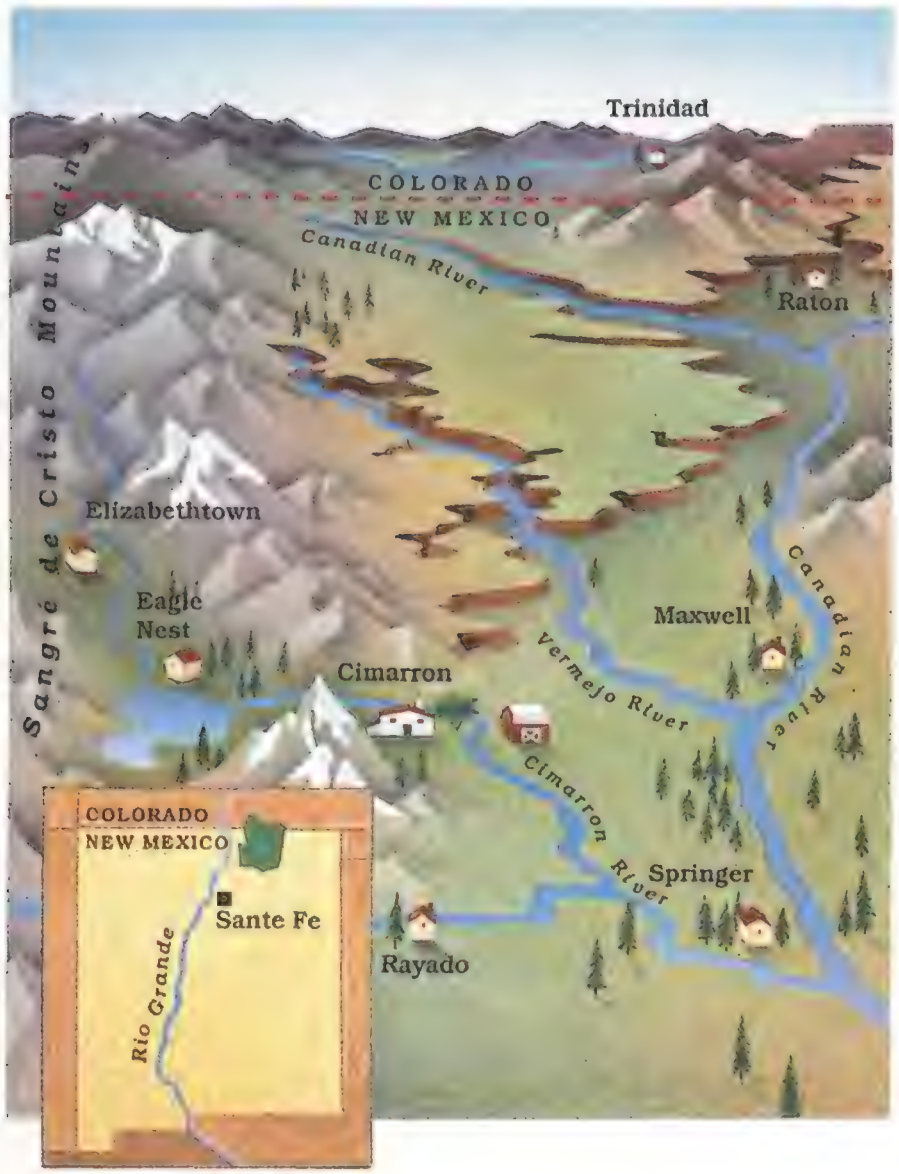
*Twice as large as Rhode Island*

In today's settled-up, subdivided, tidily platted and recorded America, riven as it is by highways, roads and streets, neatly pinned down by addresses and Zip Codes, linked up and trussed together by phone, fax and modem, it may be a tad difficult to get a handle on the notion that two million acres of the Republic remain unknown. But there it is, up in the northeastern reaches of New Mexico, the Maxwell Land Grant, 2,680 square miles—a chunk of real estate more than twice as big as Rhode Island that most people have never heard of. To be sure, there are a few history buffs around who know who Maxwell was and where his territory lay. Of course, the land grant has been written up, just like Maxwell himself, in history books and scholarly journals. But the details have long since become so blurred by the swirl of events—Indian raids, gun battles, hornswogglings, lynchings and swindles of one kind and another—that today when you ask about Maxwell and his land, even a lot of the locals give you a blank look.

The sheer sweeping majesty of the place dwarfs the human struggles that have been waged on it. Place? The Maxwell Land Grant is too vast to be called a mere place. It is a region, palisaded by great looming mountains that brush the sky to the north and west, moated on the east and south by a sea of grass, the Great Plains. There is not just *a* river running through it; several rivers run through it. Their names evoke the legends of the West: the Cimarron and the Vermejo, sassy little Commanche Creek and, off to the east, the Canadian. Names? Maxwell's old spread sounds like a site plan for a Western theme park: Graveyard Canyon, Get Away Canyon, Touch-Me-Not Mountain, Humbug Gulch, Castle Rock, Lookout Canyon, Midnight Mesa.

But it's all real. Grind over passes nearly 10,000 feet above sea level and you can see snowcapped peaks still glowing thousands of feet above you. Hairpin down to marvel at the cathedral-like walls of myriad canyons, savor the texture of the light washing across the rippling grass of enormous meadows, listen as a coyote howls

*Photographs by William Neill*



Maxwell's vast holdings (green area, map inset at left) included towns, rivers, mountains and plains. Land baron's likeness hangs in a Santa Fe bank he founded.

and a cougar snarls, ponder the clatter of bear claws ripping open the cooler in the back of your pickup, and Maxwell's land begins to work its magic. Why, just like Raquel Welch in the movie that took her adventuring through the alimentary canal and bloodstream of a living human body, you find that you are experiencing, in 3-D panoramic living color, nothing less than a CAT scan of the geography, geology and history of the West.

Things haven't changed much here since Maxwell's day. Wolves don't run in huge packs as they once did. You no longer have to set up a platform in your fields to enjoy a safe haven from grizzlies. But it's still pretty lush. Twenty years ago or so, when the feds were thinking of picking up just a piece of the old Maxwell place for a national park, an inventory of the 480,000-acre parcel under consideration, the Vermejo Ranch, found that it alone was home to 7,000 elk, 40,000 deer and 300 pronghorn antelope. It enfolded 60 lakes with 2,000 surface acres of water and 100 miles of streams. Multiply that times four, mix in untold numbers of black bears, grouse, quail, doves, ducks, eagles, hawks, owls, rabbits, squirrels, chipmunks, 35 jillion prairie dogs and frogs, and you've got some idea of the almost unbelievable fecundity of the Maxwell Grant.

*It was even more glorious*, as wild as wildness gets, when Lucien Maxwell decided to start a settlement in 1848 and join the only other residents, some dispossessed Ute and Apache Indians who were as unwelcoming as the land itself. It was no place for a greenhorn, and Maxwell, then 30, was anything but. He had already been an Indian trader for some time when he went out from St. Louis along with cool, blue-eyed Kit Carson and Capt. John Frémont, exploring across the plains and into the mountainous West. "Maxwell," Frémont noted in his journal, "was about five feet ten inches in height, and strongly built. He was personally known, by trading among them, to the tribes who ranged the country toward New Mexico, accustomed to the life of the prairies, and a resolute man and good hunter. Carson and he were close friends."

Maxwell showed his stuff, Frémont reported, when he forthrightly saved the expedition's bacon one exciting day, bravely confronting a band of some 300 Arapaho warriors just as the shooting was about to start. "You're a fool, God damn you!" Maxwell yelled at one of the attackers. "Don't you know me?" It turned out the Indians were from a village where Maxwell had lived and traded a couple of years before. Instead of fighting, thanks to

*Freelancer John Neary is based in Tesuque, New Mexico, and enjoys crossing nearby mountains to hike on land formerly part of the Maxwell Grant.*

Maxwell, the two sides shook hands. By the time Maxwell had ridden with Frémont on two expeditions and had worked with the Indian traders Bent, St. Vrain, and Co., the West from the Mississippi to the Pacific was his home. He knew the land and its fierce people, and with an awesome courage and self-confidence he was comfortable in it and with them.

So Lucien Maxwell already was a mountain man when he decided to set himself up as a rancher on a parcel of land his father-in-law, Charles Beaubien, had obtained in 1841 as a grant from the Mexican government, which then controlled much of what is now the American Southwest. When Beaubien, a prosperous merchant in Taos, and his partner, Guadalupe Miranda, asked the provincial governor for the grant, they sounded just like developers in New Mexico today: the region, they said, desperately needed to grow socially and economically, and they were just the men to do the job.

They themselves, the partners had beseeched the governor in Santa Fe, were the heads of large families and needed more land. Their specific aim, Beaubien and Miranda said, was to make the grant pay by raising sugar beets, cotton and sheep, as well as "stock of every description." With the jaunty assurance of the promoters they were, they declared: "This is the age of progress and the march of the intellect and they are so rapid that we may expect at a day not far distant, that they will reach even us."

That gung-ho boosterism may have struck just the right note with Mexico's governor for New Mexico, Manuel Armijo. Or perhaps the quarter-interest in the grant that Beaubien and Miranda were said to have promised him had something to do with his decision. Too, the land Miranda and Beaubien wanted lay directly in the path of what was becoming a floodtide of Americans. Upon gaining independence in 1821, Mexico had welcomed the Americans and their wagons, but 20 years later it was becoming increasingly clear that those gringos were hell-bent on taking over. A settlement on the other side of the mountains from Taos, out on the edge of the plains where the Santa Fe Trail neared the heart of what Mexico claimed as its northernmost province,

Today, Maxwell's first settlement, at Rayado, is part of the Philmont Scout Ranch, owned by the Boy Scouts of America. The house at left, now a museum, contains the core of the first mansion Maxwell built.

would help enforce that claim. Whatever the reason, it took Armijo only three days to approve the grant.

Five years later the governor's worst fears came true when Gen. Stephen Kearny led American troops into New Mexico. Armijo put in a brief appearance at the head of a ragtag militia defending Santa Fe; then he and Miranda fled to Chihuahua. Undisturbed by the tumult, American-born Maxwell and his wife, Luz, built themselves a rambling one-story hacienda on the grant, at a spot called Rayado—which means "streaked" in Spanish, perhaps referring to the spectacularly striated cliffs not far away. Now a museum, the renovated house still stands, its seven chimneys intact (p. 47). Kit Carson joined them, building a place only a few miles away. The two men, Carson explained, had decided to settle down because "we had been leading a roving life long enough and now was the time, if ever, to make a home for ourselves and our children. We were getting old and could not expect . . . to gain a livelihood as we had been [for] such a number of years." They were, in fact, still quite vigorous—Carson was only 40, Maxwell just 31—and it wasn't long, Kit marveled, before he and Maxwell "were in a way of becoming prosperous."

Maxwell was finding business a rewarding arena for his mountain-man daring. He and Kit could put together a couple of herds of sheep, drive them through Wyoming to California—a mere bagatelle of a hike across more than a thousand miles of mountains and desert—and net anywhere from $20,000 to $50,000 apiece for their efforts. On one such drive they purportedly hauled in $100,000—but lost it to highwaymen on the Oregon Trail. Undaunted, the story goes, they assembled another herd and did it all over again.

*Where's the beef? Ask Maxwell*

By 1857, when Carson was testifying in Lucien's behalf to help establish title to the land (the question of ownership was to prove a murderous curse on the grant), he told the government's surveyor general that Maxwell had in just ten years turned 200 acres of wilderness into farmland, put up buildings worth $15,000 and was running 15,000 head of livestock in his pastures. He was using the beef to provision the Indians whose hunting success had been reduced by settlements in their old hunting grounds. He was similarly provisioning the troops brought in to quell the Indians when they got restless about the skimpy provisions.

In 1858 Maxwell moved 12 miles north, from Rayado to the banks of the Cimarron River, building there a comfortable house. A few years later he hired an engineer from faraway Boston to design a handsome three-story grist mill, still standing, that he called the "Aztec" (p. 52). It was capable of grinding 15,000 pounds of wheat a day—most of it his.

Fall colors transform quaking aspen (above) in national forest that was part of the original Maxwell Land Grant.

Reflected sunset glows on the surface of a lake that is protected within the Maxwell National Wildlife Refuge.

Maxwell and his extravagant way of life became the marvel of the region. In a land of simple log or adobe houses, he had a mansion with high, molded ceilings, deeply piled carpets, velvet drapes, paintings in gold frames and not just one but four pianos, two for each floor. A frequent visitor in Maxwell's home, Col. Henry Inman, who was stationed at Fort Union, 55 miles south, was awestruck by the opulence. Maxwell, Inman wrote, "lived in a sort of barbaric splendor, akin to that of the nobles of England at the time of the Norman conquest."

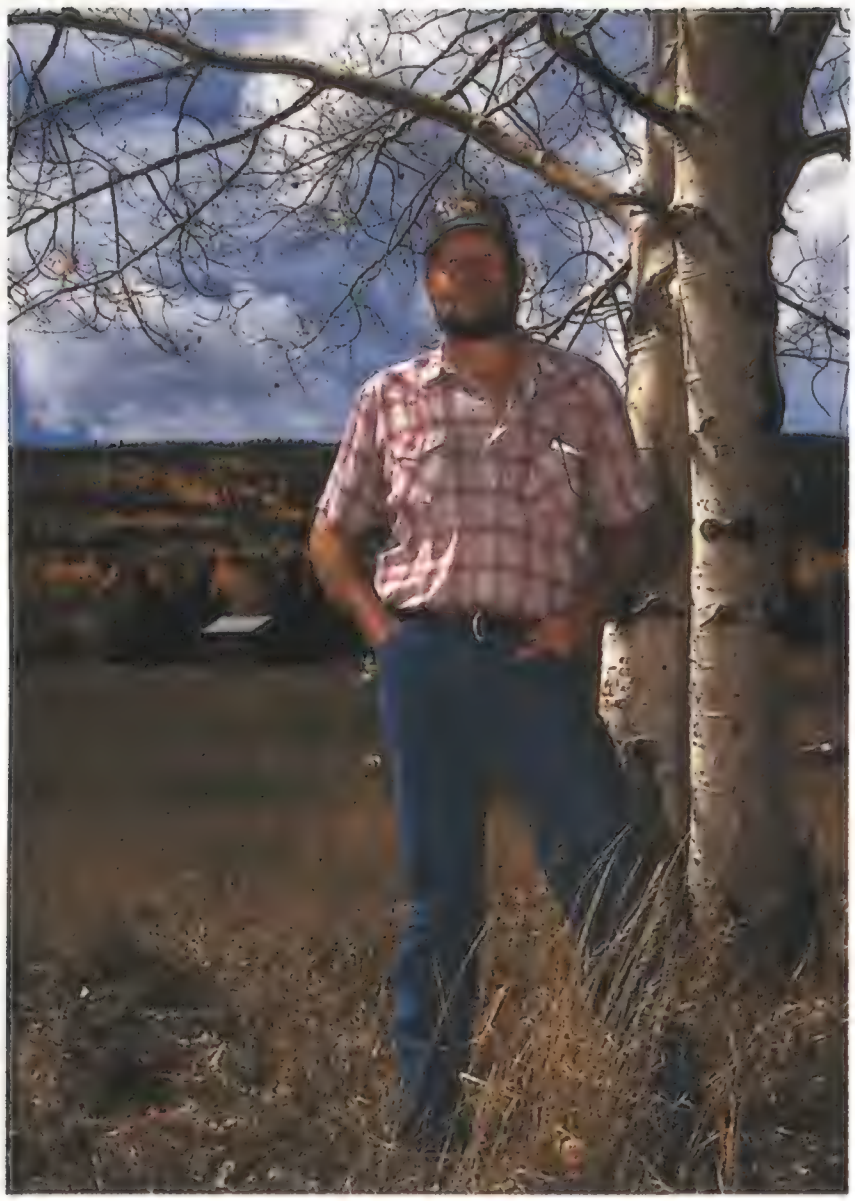
*He ran his estate like a feudal lord*

Inman was not merely waxing poetic. "The thousands of arable acres comprised in the many fertile valleys of his immense estate were farmed," he wrote, "in a primitive, feudal way, by native Mexicans principally, under the system of peonage then existing in the territory." Inman estimated Maxwell's work force at about 500 men—some others thought it was closer to 1,000—and, Inman said, "they were as much his thralls as were Gurth and Wamba of Cedric of Rotherwood, only they wore no engraved collars around their necks bearing their names and that of their master."

One of Maxwell's men once said of him, "If a Mexican servant didn't suit him or did anything against his orders, he took a board or plank or anything he could get hold of, and whipped him with it. I knew him to tie up one man, a Mexican, and shave off the side of his head close to the skin with a butcher knife, then he struck him 15 or 20 lashes with a cowhide, and told him if he ever caught him on the place again, he would kill him. Some 12 or 15 years later, he came back with a bunch of stolen horses, and Maxwell did kill him."

With such a reputation for brutality, Maxwell could openly flaunt his wealth, could leave the solid-silver table service out in plain sight, could keep as much as $30,000 in cash in an unlocked dresser drawer. When Inman chided him and suggested he invest in a safe, Maxwell "only smiled, while a strange, resolute look flashed from his dark eyes, as he said, 'God help the man who attempted to rob me and I knew him!'"

Once, two burglars took hundreds of dollars' worth of goods from Maxwell's Cimarron store, along with a valuable horse. One was caught by Maxwell's posse and brought back. Maxwell clamped a 40-pound chain around the thief's neck to slow him down, imprisoned him in a cellar for two days without food and water to give him time to ponder his crimes, and then had him stripped and tied to a post. After a servant had struck 25 lashes, Maxwell freed the prisoner—and then ordered the servant stripped and tied. When the servant, who had passed out at the pain of the 15th lash, revived, Maxwell said, "Now, when I put you to whip a man, I want you to do it as *I* whipped *you*!"



Moe Finley, Maxwell's great-great-grandson, runs a bait-and-tackle shop for fishermen at Eagle Nest Lake.

Maxwell could take pain as well as dish it out. When a Fourth of July cannon, a rusty old six-pound howitzer, fired prematurely, it injured his thumb, and the thumb mortified. Maxwell endured the amputation without an anesthetic while his friends Inman and Kit Carson held the lanterns. After the silver ligatures were twisted to close the wound, Inman said, "I offered Maxwell, who had not permitted a single sigh to escape his lips, a half tumblerful of whiskey, but before I had fairly put it in his mouth, he fell over, having fainted dead away, while great beads of perspiration stood on his forehead, indicative of the pain he had suffered, as the amputation, the surgeon told us, was as bad as that of a leg."

Maxwell's cruelty toward Mexican-Americans infected his sense of humor. When a Mexican man found a box containing some $8,000 that Maxwell had shipped East but which had fallen off the coach, Maxwell gave him 25 cents. "Here," he said, "go and buy a rope and hang yourself. If you found a box like that, you ought to know enough to keep it."

For all his harshness, Maxwell was renowned for his generosity as a host. Inman recalled, "Covers were laid daily for about 30 persons; for he always had many guests, invited or forced upon him in consequence of his proverbial munificence, or by the peculiar location of his manor-house which stood upon a magnificently shaded plateau at the foot of mighty mountains, a short distance from a ford on the Old Trail. As there were no bridges over the uncertain streams of the great overland route in those days, the ponderous Concord coaches, with their ever-full burden of passengers, were frequently water-bound, and Maxwell's the only asylum from storm and flood; consequently he entertained many."

The Maxwell house was no mere travelers'-aid station by any means. In what Inman called the "Baronial Hall," Maxwell "received his friends, transacted business with his vassals, and held high carnival at times." Maxwell loved racing and fast horses, built a track, engaged a trainer and ran races for big purses every week or so—and sometimes every day. In his gaming rooms, cards flashed in a nightly whirl of monte and poker, the chuck-a-luck and roulette wheels clacked and rattled, and the balls clicked on his billiard tables. Maxwell and Kit Carson, Inman remembered, would play a six-card game called "seven-up," or "old sledge," for hours—Carson usually winning—and there were other games too, with other old cronies, and always for money. William Sherley (Old Bill) Williams, a mountain man, lost $1,000 to Maxwell in a single game of seven-up.

Inman said Maxwell "always extracted the last cent he won, though the next morning, perhaps, he would present or loan his unsuccessful opponent of the night before $500 or $1,000, if he needed it; an immensely greater sum, in all probability, than had been gained in the game." Indeed, Maxwell was fond of such grand gestures. Once, it is said, after a wealthy traveler from the East insisted on knowing how much he owed for a night's lodging, Maxwell at last roared, "Well, then it is twenty dollars, God damn it!" and when the flabbergasted guest handed over the huge sum, Maxwell used the bill to light his cigar.

*Bonanza, schmonanza—it's* only *gold!*

The man had a strange kind of devil-may-care attitude toward money. He knew there was gold on his land—he was even said to keep a few nuggets around for children to play with—but would never trouble himself to look for it. When late in 1866 soldiers made a strike up on the western slope of Baldy Mountain, on the western edge of his territory, Maxwell did not contest their claim. News of the bonanza brought in hundreds of treasure-seekers, and boomtowns like Elizabethtown—just the skeletal stone wall of one building and a lonely graveyard on a hill are all that remain—began to sprout. Maxwell laconically contented himself with a mere $24 annual rent on each placer claim and soon formed his

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own mining company. "Mr. Maxwell," gasped the editor of the Santa Fe *New Mexican*, upon estimating Maxwell might be sitting on as much as $2 million in gold in his Aztec mine alone, "will in a short time be known as the greatest gold producer on the globe."

It didn't seem to thrill Maxwell all that much. The mountain man who had braved death in countless face-to-face confrontations, who had made thousands of dollars by his courage and wits, who had become the largest landowner in American history, began to act as if he had somehow transcended his own success. The country was crowding up. His settlement along the Cimarron had become a small town. Maybe it was that his old comrade Kit, who had moved away across the mountains to Taos years before, died in 1868. Maybe Maxwell was tired of all his responsibilities. Whatever, he decided in 1869 that it was time to break camp and cash in. He was 51.

By October of the next year, Maxwell was gone, his grant sold to a combine of investors. While his landsmen and the Indians he had fed were ruing his departure, Maxwell moved some 125 miles south and east, where he hoped to buy from the government the then abandoned Fort Sumner, which only six years before had been used for interning the Navajo Nation after its rout by Kit Carson. Maxwell renovated the officers' quarters at the fort into a commodious house for his family. A little more than a decade later, William H. Bonney, a.k.a. Billy the Kid, was shot and killed there by Sheriff Pat Garrett (SMITHSONIAN, February 1991). Maxwell tried his hand at raising Merino sheep, raced horses, reportedly got tangled up in a scheme to build a railroad from Texas to Yuma, Arizona, that went bust, tried his hand at banking—and seemed to slump into a slow decline. In the summer of 1875 Lucien Maxwell died from what was diagnosed as uremic poisoning.

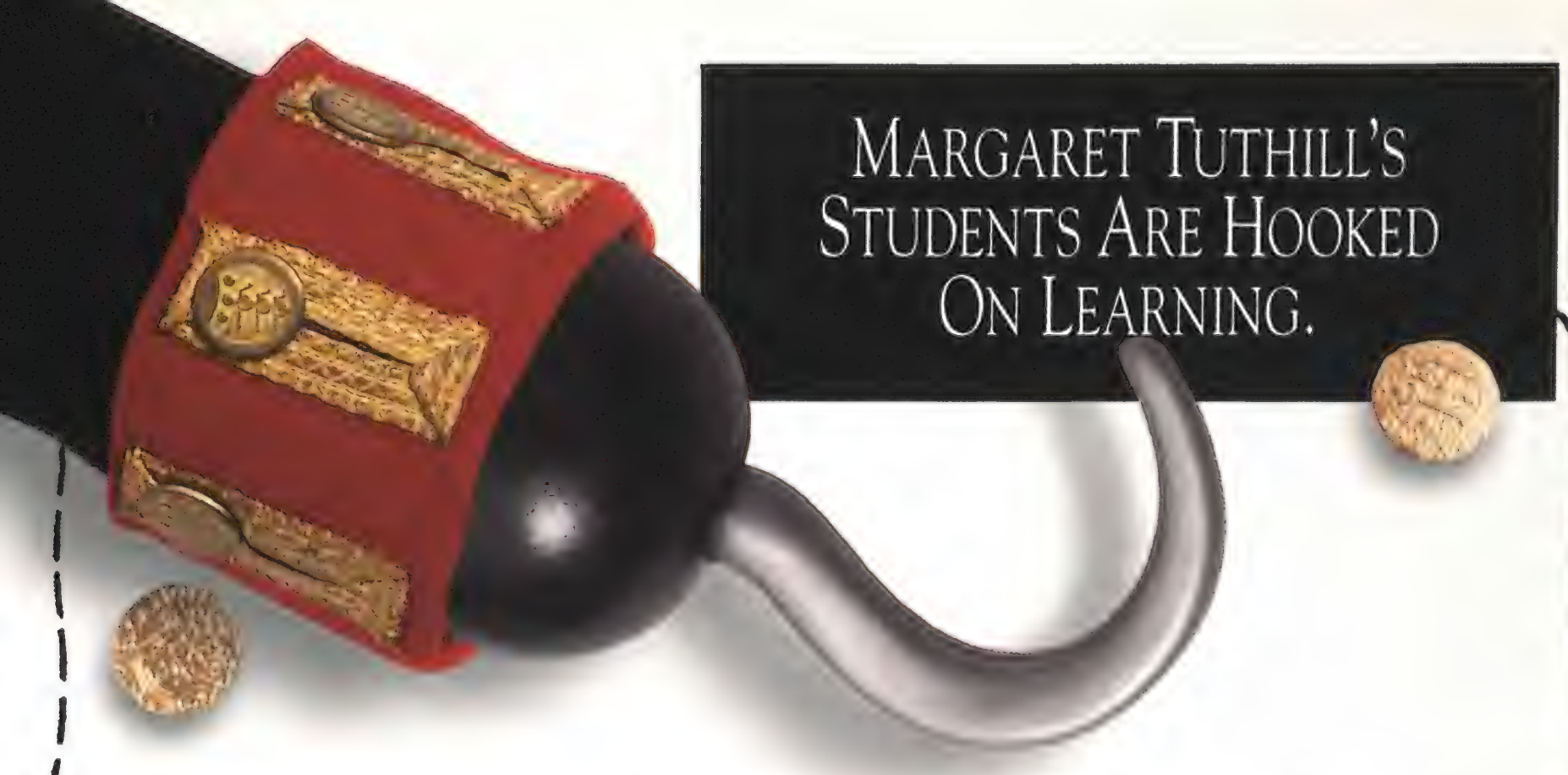
Currently a museum of regional history, sturdy Aztec Mill in Cimarron was built by Maxwell to grind wheat.

### *Sizing up a land without bounds*

Back in Cimarron and elsewhere around the sprawling land that had been Maxwell's demesne, his former subjects found themselves living through a nightmare of confusion that eventually turned into a heartbreaking war for their land. Incredibly enough, it largely happened because nobody, neither Miranda nor Beaubien, neither Mexico nor the U.S. Government, and least of all Maxwell himself, had ever bothered to ascertain the precise boundaries of the grant. It was just too big to get a handle on. Yet, the U.S. Government was bound by the Treaty of Guadalupe Hidalgo, which ended the war with Mexico in 1848, to recognize all valid preexisting Spanish and Mexican land grants.

Beaubien had gone through the formality of filing a claim with the new U.S. Surveyor General right after the war, and in 1857 the Surveyor General had approved the claim, and in 1860 Congress had confirmed it—all without anybody ever troubling with the nuisance of actually sending a crew out with transit, rod and chain. But when a subsequent act of Congress made a survey necessary, the budget-conscious commissioner of the General Land Office noticed that he was being asked to survey a lot more land than the maximum land grant under Mexican law could possibly have allotted to Beaubien and Miranda. That would have been 22 leagues, 11 leagues apiece—a measly 97,424 acres—while Lucien's claim totaled more than 450 leagues, or 2 million acres. The Surveyor General balked, and his boss, the Secretary of the Interior, backed him up.

Undaunted by the hairsplitting in Washington, Maxwell's advisers on the sale, some high rollers from Colorado, had gone ahead as if they had solid title and sold the grant to some British plungers for $1.35 million. Maxwell somehow managed to wind up with $750,000 himself for the grant, along with another $125,000 for his ranch, mining rights and a store he owned in Elizabethtown. The Brits incorporated as the Maxwell Land Grant and Railway Company and proceeded to sell stock on the international market, bragging that a Dutch engineer estimated mineral wealth alone on the grant was worth more than $90 million.



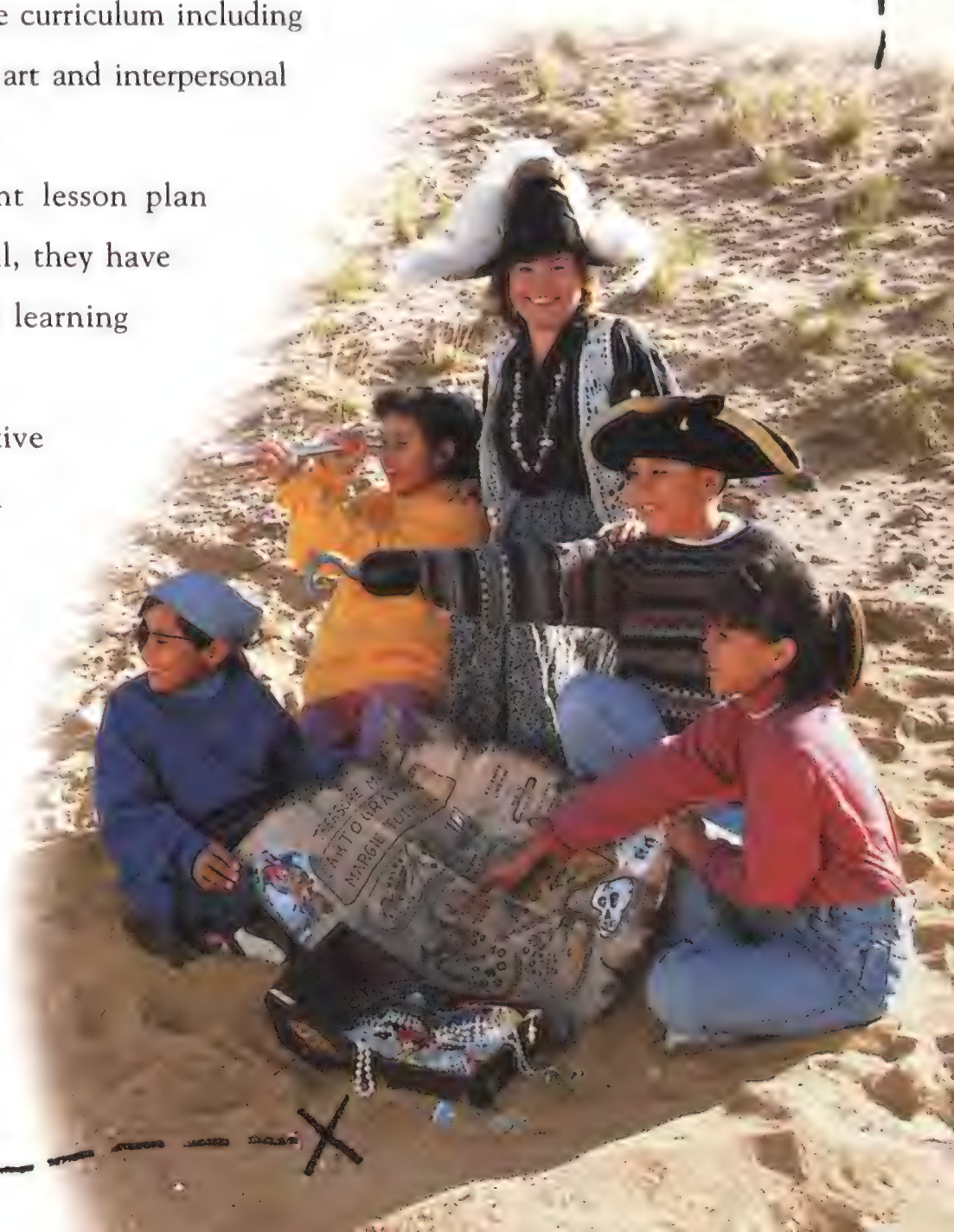
# Margaret Tuthill's Students Are Hooked On Learning.

It's yo, ho, ho and a whole lot of fun for fourth graders at Mesa Elementary in Shiprock, New Mexico. Because they're off on a treasure hunt – thanks to the lesson plan created by their teacher Margaret Tuthill.

Margaret starts with excerpts from Robert Louis Stevenson's classic novel, *Treasure Island*, to get them in the pirating mood. Then, they actually create their own buried treasure maps. During the map creation process, Margaret covers the entire curriculum including history, language arts, math, social studies, art and interpersonal communication. And, of course, geography.

She believes that her treasure hunt lesson plan "opens their eyes to the world." Best of all, they have a great time, which makes teaching and learning an adventure.

Thanks Margaret, for putting innovative lesson plans like this on the map. State Farm is pleased to donate $5,000 in your name to Mesa Elementary. (It's buried under the cottonwood tree, behind the rock, ten paces to your left.)



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In a photograph from c. 1910 (above), Maxwell's house is at left, in front of the St. James Hotel, still in business today (right).

The expectant developers opened a sales office at Maxwell's place in Cimarron and waited for the customers to rush in. And waited. Faltering gold production and the shadow of Indian attack spooked potential buyers. Meanwhile, folks who had already settled on the grant were riled at the brisk way the new owners tried to collect rents. In 1874, after the company withdrew a deposit for a survey, the lands commissioner declared the grant open for homesteading, and three years later, to make the situation even more complex, Colfax County sold the grant at auction to some Dutch speculators to meet a tax assessment. The new owners went after the settlers with renewed zeal. Then the government finally did commission a survey, determining that the grant comprised 1,714,764 acres. Secretary of the Interior Carl Schurz himself confirmed it with a patent in 1879.

But due to a continuing merry-go-round of legal turnabouts and other surprises, that resolved nothing. The settlers who had been moving onto the land got involved in a nasty little war with the hired gunslingers of the company that claimed to own it and wanted to move them off. Isolated on their remote ranches, with no ready access to lawmen and scarcely recognized by the territorial government, the settlers were outnumbered and outgunned from the start.

A few brave men tried to turn the situation around. The Rev. Thomas J. Tolby attempted to organize the settlers—and was murdered in lonely Cimarron Canyon. A rancher named Clay Allison, a Civil War veteran on the Southern side known to be handy with a gun, shot a few men he thought were harassing homesteaders, but even his six-guns could not win the war.

So powerful were the men who claimed to own the grant that in 1884 they persuaded the territorial governor to field a force of 35 "militiamen." It was led by a gunman named Masterson—Bat's brother Jim, who was imported from Trinidad, Colorado, for the job. George Curry, a resident of nearby Raton, rounded up a posse of ranchers, then bought up all the guns and ammo for sale in town and marched the "militia" at gunpoint to the Colorado line.

The guns roared for another several years until, in the spring of 1887, the Supreme Court of the United States upheld the survey and reaffirmed the patent of 1879, thus legitimizing the Maxwell Land Grant Company in its efforts to drive out the settlers. Abandoned by their government, many of the homesteaders bought or leased their places, some just gave up and left, and a few continued the struggle, in the forlorn hope that the government might once again reverse itself.

The grant is mostly quiet now that Maxwell's fiefdom has been all parceled out, carved into several huge ranches, a state park, a national forest and wildlife refuge, and other public and private preserves. The only gunfire heard nowadays comes from the black-powder enthusiasts and the target shooters at the National Rifle Association's 52-square-mile retreat near Raton, and from the hunters who come after the region's abun-

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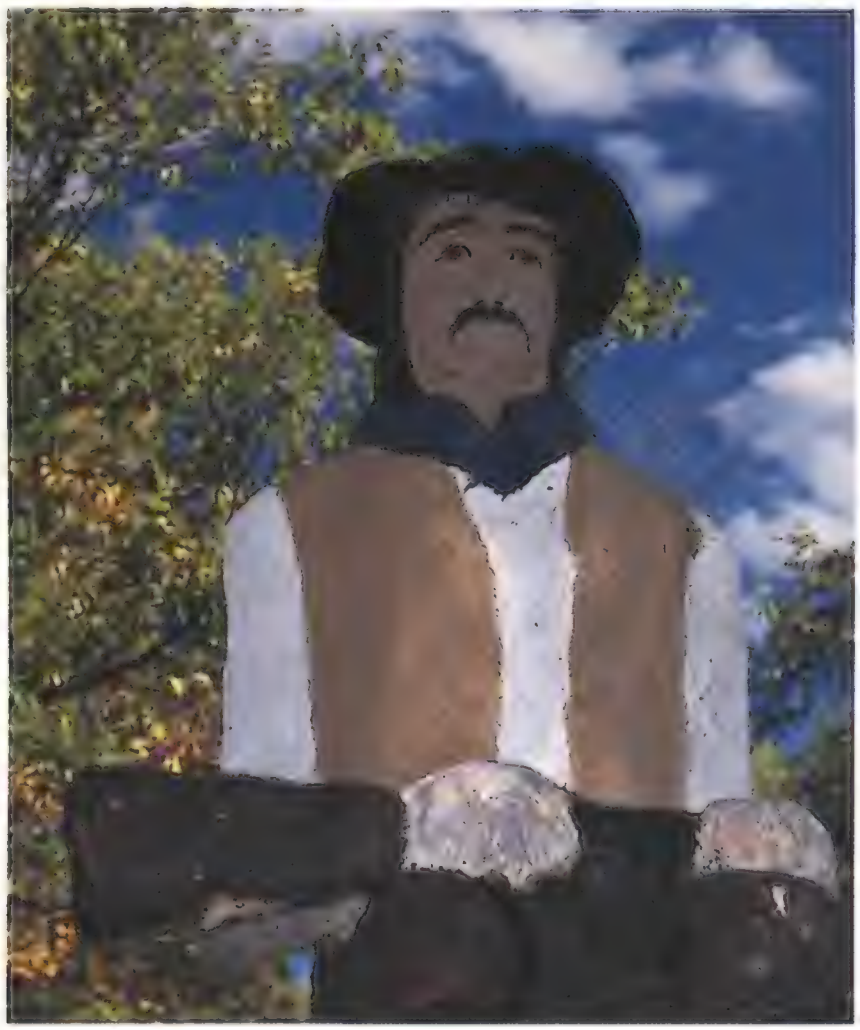

Concrete statue in Cimarron, the sole nearby monument honoring Maxwell, gets a paint touch-up periodically.

dant game. The Boy Scouts of America are busily hiking the 300 miles of trails that lace the 137,493 acres at their Philmont Scout Ranch west of Cimarron, where they have turned what remains of Maxwell's Rayado settlement into a museum of local history.

The landscape that was all Maxwell's is still one of the loveliest, least-spoiled places on Earth, and when one of the private holdings sells, it is for millions of dollars. Ironically, the region that Beaubien and Miranda wanted to develop has become a haven for those seeking to escape development. The Vermejo Ranch, for example, 33 times the size of Manhattan, some 500,000 acres that once were Lucien's, became the hideaway home of a Chicago grain baron, wing-collared William Bartlett. He built three mansions with walk-in safes and a porphyry marble fireplace in a living room big enough to go hang-gliding in, with a railroad for his guests' convenience. It later became a private resort for movie stars like Douglas Fairbanks jr. and Mary Pickford, and in the early 1970s went for a bargain $26 million to Pennzoil, after such prospective buyers as John Wayne and Mitsubishi of Japan looked at it.

Lucien still has kinfolk here. One family member, for example, is J. B. Turner, a descendant of Ferdinand Maxwell, Lucien's brother. Turner is the Cimarron police chief and says things have calmed down a lot since the old days. The biggest case lately was a bank robbery in 1987, he says, "and we caught 'em right away." Moe Finley runs a boat-and-tackle shop on Eagle Nest Lake, just south of Elizabethtown, where his great-great-granddaddy Lucien had a store. Moe keeps a framed copy of one of the Maxwell Land Grant Company maps on the wall of his dining room, and he laughs as he says of his place, "We had to buy it to get it. I wish he'd left us the Vermejo, or 100,000 acres—or something!" The lake where Moe and his wife, Jo Lynn, run their boats is owned by the CS Ranch, which is named—as is the nearby town of Springer—for Charles Springer, a lawyer who did much to help the company hang on to the grant.

Pondering the question of what difference Maxwell made to the region, Les Davis, who owns the CS, says, "The territory would have opened up a lot slower without Maxwell. Cattle, farming, timber—the land grant was used for the purpose the grant was given originally."

A new relatively civilized ambience pervades the grant nowadays. Hikers, backpackers and history buffs are the folks traveling the old Santa Fe Trail. But you can still stand in the hall of the St. James Hotel in Cimarron and marvel at the plaque commemorating Clay Allison and the roster of men he killed—19 in all, not counting the Civil War—or step into the dining room and count the bullet holes in the pressed-tin ceiling. Down the street, you can tour Maxwell's mill, now a museum, and see the pike upon which, according to curator Buddy Morse, a jubilant mob impaled a highwayman's head.

Nearby is the only monument to Lucien Maxwell to be found on the old grant, if you don't count the sleepy hamlet named after him that lies about 20 miles east. Immortalized, more or less, in this concrete folk-art sculpture (above), Maxwell is seated regally, but he looks restless, facing west, rifle at hand, ready to hit the trail.

Off the blacktop, the beauty and mystery of the land that was Lucien's kingdom endure. Nearly every turn in any trail you take back here reveals another marvel to be savored: a herd of elk browsing, the majestic sweep of a red-tailed hawk, an elegant adobe melting back into the earth. The wind drives the grass like ocean surf, and the clouds throw shadows across the mountain slopes, and if you concentrate maybe you can spot a splintered flume way up there, left by some miner a hundred years ago or so. But that's not really such a long time, you realize. It's just one long moment here in Lucien Maxwell's enormous kingdom, where the air is still so clear, where the sage and juniper and piñon are outlined so sharply against the granite a few miles away, that it feels as if you can see forever.

Cimarron River runs a snaky course past spectacular cliffs in a park that was once part of Maxwell's domain.

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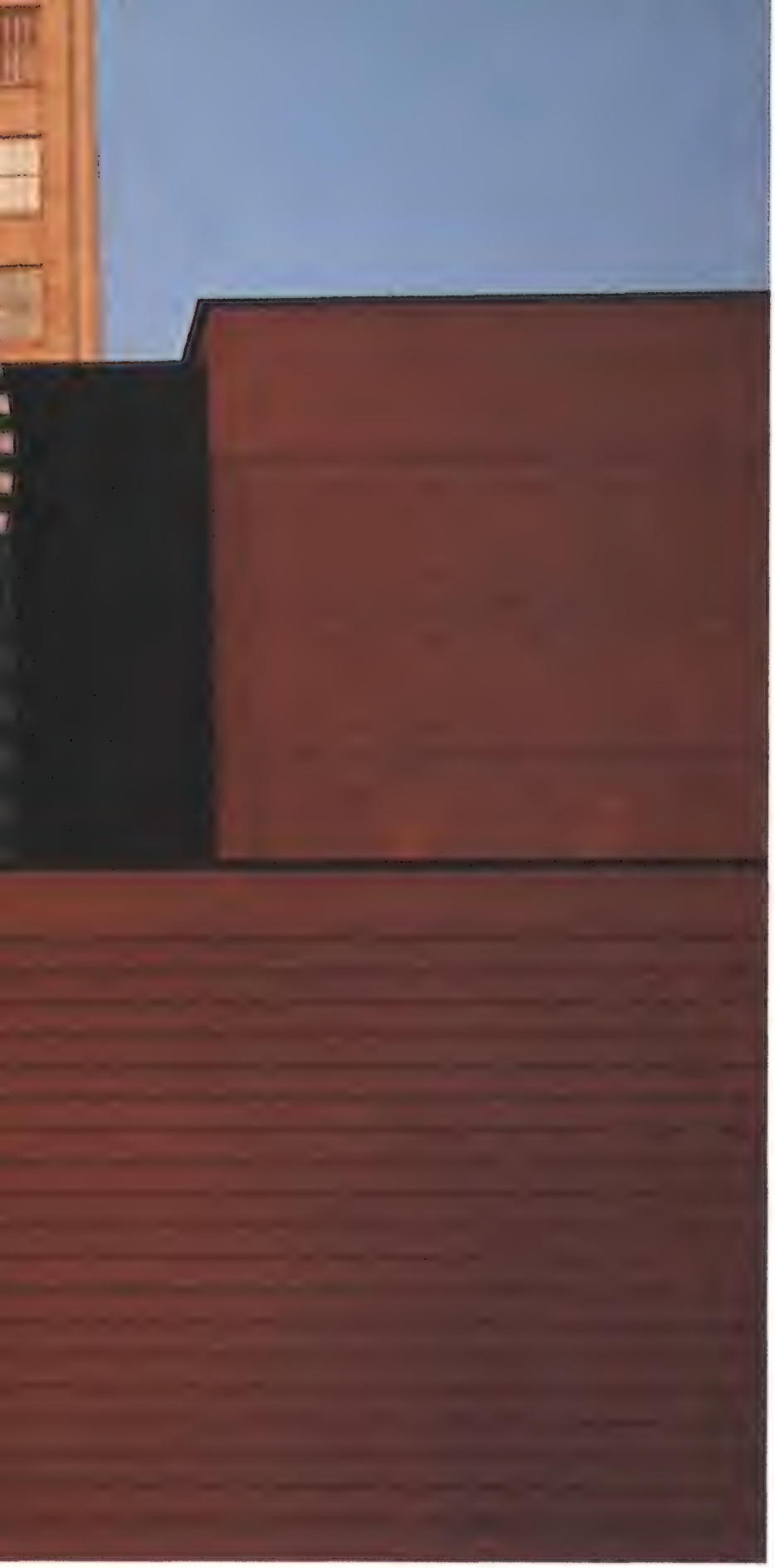
# A vibrant new heart for art in San Francisco

*The old working-class neighborhood called SoMa—for 'south of Market'—is a happening in itself, as museums and galleries multiply*



On a Yerba Buena garden path, Terry Allen's bronze, life-size *Shaking Man* brings almost everyone to a stop.

Huge skylight of Mario Botta's new home for the San Francisco Museum of Modern Art is an area landmark.

Generations of San Franciscans have ended their eight-hour shifts in the bars and cafés along San Francisco's Third Street, where longshoremen, bus drivers and journalists once shouted over games of bar dice and argued politics over tumblers of red wine and slices of pizza during the twilight of a long day. Today, I'm pondering the menu of the new Caffè Museo in the just-opened San Francisco Museum of Modern Art on Third Street, wondering if a glass of Montepulciano would go with the garlic sausage focaccia. Upstairs in the museum's gleaming galleries, visitors from Brooklyn are studying the oversize, 1950s-era black-and-white photographs by William Klein, hoping to recognize a face. "I used to have a hat just like that," says one woman. "Remember, back then, we all wore white gloves?"

Across the street from where I sit, the face of Yoda, the extraterrestrial guru from *The Empire Strikes Back*, stares down from a huge billboard, peering into the crowded café as if pondering lunch. Around me, young men in Army fatigues and women in Chanel suits dig into plates of goat cheese "Lasagnette" while, in the background, the piped-in voice of Otis Redding sings "I'm A Love Man."

I must be experiencing modernism.

If modernism is an expression of the unruly intersec-

*Photographs by Morton Beebe*

Works on view at SFMOMA include, clockwise from top, Joan Brown's thickly impastoed *Noel in the Kitchen*; Richard Diebenkorn's study in cool hues, *Cityscape I*; Robert Arneson's tongue-in-cheek *California Artist*.

tions of contemporary life—of urban angst and classic grace, of poetic abstraction and digital wizardry—then not only the city's newest museum building but the neighborhood surrounding it is a model of modernist ideals. A cultural shift is taking place here in the center of San Francisco, marked most dramatically by the January opening of the new brick-clad, broad-shouldered home of the San Francisco Museum of Modern Art (SFMOMA). Over the next few years, many of the city's important arts institutions will move to this area as part of a massive redevelopment project known as Yerba Buena Gardens. By the end of 1997, visitors will be able to spend the day in an 87-acre downtown playground where they might start out by viewing a breathtaking roomful of paintings by Clyfford Still in one of SFMOMA's sunbathed galleries and finish with the latest Bruce Willis thriller at the cinema complex across the way, where they'll find a waterfall nestled in a canyon of high-rise office buildings and a 1903-vintage carousel swirling near the high-tech multimedia center for children.

At present, just across the street from SFMOMA is the Center for the Arts at Yerba Buena Gardens, a gallery and theater complex dedicated to multicultural arts where, on the day of my visit, Yoda's benign countenance advertises an exhibition of artifacts from the *Star Wars* films—an event that's lured more people into the gallery than even the most thoughtful conceptual-art shows mounted there in the past year. Within walking distance are the Ansel Adams Center for Photography; two print gallery-workshops, Crown Point Press and Aurobora Press; Capp Street Project, an alternative space for site-specific installations; the Cartoon Art Museum; the American Indian Contemporary Arts gallery; and several dozen commercial galleries.

The new home of the California Historical Society opens nearby later this year; the Mexican Museum plans to relocate to the area by 1998; and the Jewish Museum has a site earmarked for its new facility. A children's entertainment center is in the works, along with a day-care center, ice-skating rink, a 15-screen movie theater and a supermarket. Last year voters approved a bond issue to convert the old main library nearby to a new home for the Asian Art Museum, which will bring it across the city from Golden Gate Park to a more accessible location.

That SFMOMA is part of this kaleidoscopic and occasionally bizarre mix of high and low culture illustrates the challenges faced by the city's most established arts institutions as they move into the next century. "The audience for museums of modern and contemporary art grew greatly in the postwar era, and with that growth came different demands and expectations," explains SFMOMA's director John Lane, a tall man who picks his way through a sentence like a soldier avoiding land mines. Lane is one of a new breed of museum administrator who must be part academic and part entertainment coordinator. "The wish for more information came with this larger audience," adds Lane, "and so too did the wish for an experience that went beyond the permanent collection, that looked at the museum as a place for learning and leisure time. So institutions responded with more educational programs, museum stores and restaurants." In other words, those temples to fine art are increasingly faced with the often uncomfortable process of fitting into a contemporary puzzle of public services.

*Writer Chiori Santiago, whose articles appear frequently in* SMITHSONIAN, *has covered the SoMa scene since artists first started moving in during the mid-1980s.*

*A move to the city's center*

Seven years ago, SFMOMA's board decided to relocate the museum from its original quarters in a stately Beaux-Arts building across from City Hall to an empty lot south of Market Street, a move that would place it near the heart of a bustling commercial district. More than $90 million was raised, almost all of it from private pockets, to build the $60 million museum and endow its operations. But not all of the museum's wealthy patrons applauded the venture. Many were aghast when the location was announced. Market Street was the traditional boundary denoting San Francisco's working-class district. On the wrong side of the streetcar tracks running down Market Street, the neighborhood that is now becoming a cultural center was dubbed "south of the slot" and was known for its modest flats, hardworking immigrants, dedicated unionists and soapbox Socialists. During the 1980s, SoMa—short for "south of Market"—blossomed as an alternative art scene as artists converted warehouses into studios, set up tiny galleries and turned old bars into lively hangouts. Still, some of the old San Francisco families who were asked, in 1990, to donate to the campaign had never set foot south of the slot. "I wouldn't even think of parking my car down there" is how one trustee put it.

"Some of those old fogies on the board didn't like it at all," declared white-haired Phyllis Wattis, one of the farsighted trustees who urged the hesitant board toward the SoMa site. "I felt like telling them to just get with it! This city has always needed a modern art museum and that's all there is to it. I can remember when I was a girl, we didn't have a clue as to what was happening in art. We didn't have any."

In 1935 San Francisco did have two prominent arts institutions: the M. H. de Young Memorial Museum, opened in 1895 by the publisher of the *San Francisco Chronicle,* and the California Palace of the Legion of Honor, completed in 1924. Together known as the Fine Arts Museums of San Francisco, their collections fo-

Capp Street Project, which hosts site-specific art shows, has a new home in a renovated firehouse.

cused on traditional European and American art, and artifacts from Asia, the Mediterranean and the Americas. That wasn't enough for a group of art lovers organized as the San Francisco Art Association, who decided the city needed to "catch up . . . with all that had been developing in art since the [18]70s when Impressionism introduced a new manner of seeing and painting." They combined forces with performing-arts groups and influential veterans' organizations to build the imposing granite War Memorial Veterans' Building to house veterans' programs and a new art museum. Its doors opened on January 18, 1935, under the guidance of director Grace McCann Morley. "This was the first modern art museum in the West," says Brooks Walker jr., chairman of SFMOMA's board of trustees for 11 years. "We were the only game in town for a long time."

The foundation of the collection was laid by Albert M. Bender, a patron of Latin American art whose donation of 36 works included Diego Rivera's *Flower Carrier* and Frida Kahlo's portrait of herself and Rivera on their wedding day. Ansel Adams convinced Georgia O'Keeffe to contribute 40 prints by Alfred Stieglitz, and SF-

MOMA became one of the first museums to pay attention to photography as a modernist expression. When Matisse heard that collectors had lent his seminal Fauvist portrait *Femme au chapeau* (*Woman with Hat*), he sent two drawings to commemorate the event. The museum hosted the first big solo shows of works by the charter members of Abstract Expressionism—Arshile Gorky in 1941, Clyfford Still in 1943, Jackson Pollock in 1945, Mark Rothko and Robert Motherwell in 1946—and paid similar attention in the 1970s to the energetic paintings of local Bay Area figurative artists such as Elmer Bischoff, Joan Brown (p. 62) and Nathan Oliveira.

*Isaac Stern threatened to picket*

Under Henry Hopkins' direction during the 1970s and '80s, the exhibition program expanded to include conceptual art, performance and media arts, as well as a department of architecture and design. But by 1985 its stalwart position was being challenged by its Southern California cousins, the Los Angeles County Museum of Art and the Museum of Contemporary Art. Gradually, the important traveling shows began stopping at the lower end of the state, bypassing SFMOMA. With some shock, the trustees looked around and noticed that their vision had outgrown the cramped two floors of the Veterans' Building.

Yet even at an institution devoted to examining the new, change takes place reluctantly. Hoping to avoid a move, the board considered adding a "bustle" to the back of the building; putting an I. M. Pei-type pyramid in the courtyard; and finally, trying to convince everyone else to move out, an option that would also have closed a much-loved historic theater on the first two floors. "That would have created a dramatic museum, but it wasn't a popular solution," Walker says. "We had Isaac Stern threatening to picket out front."

Trustees Gerson Bakar, Brooks Walker and Phyllis Wattis spent several years convincing colleagues that reestablishing the museum as part of city renewal projects south of Market was the only sensible move. The land had been set aside for a future cultural facility; the Redevelopment Agency would transfer title for a dollar. "We thought if we came up with a dramatic museum, we would shift the center of the city, and it would work. It could be a Venice of the West," Walker says.

For many years, the fantasy of a Western Venice lay submerged beneath a network of bad redevelopment policies, back-room deals and public protest. "The approach to redevelopment 30 years ago was not what it is now," explains Anita Hill, executive director of the Yerba Buena Gardens Marketing Alliance. "It used to be 'move 'em out, tear it down.' Today, you've got to take better care of people."

To some, south of Market may not have been much to

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look at, but it was home for hundreds of San Francisco's most staunch and opinionated citizens. Historically, the first stop for the gold-seekers and entrepreneurs who founded San Francisco's moneyed clans, it was the cradle of the city's labor movement.

A year before SFMOMA's 1935 opening, the deaths of two striking longshoremen, felled by police bullets, touched off a massive general strike that shut down ports along the whole West Coast. The strike also resulted in a memorable case of censorship when Works Progress Administration artists, who had been assigned to paint murals in landmark Coit Tower, made references to Socialist labor concerns in their work. Outraged city officials closed off the tower and its murals from the public eye for several months.

When developers tried to move hundreds of residents from the area in 1967, they sparked that old fighting spirit. Angered by the lack of public input for the redevelopment, a residents group won a federal injunction to revise the relocation plans. Lawsuits, hearings and combative committee meetings followed, keeping the development in limbo until the mid-'70s. When the dust settled, an "urban consensus" had ensured 1,500 units of low-cost housing as part of Yerba Buena Gardens.

"One of the things I like is that as a result, the project contains a lot of seniors housing, and there's a diversity of ethnicity in the neighborhood," says Andy Grundberg, director of the Ansel Adams Center for Photography. "That means the area won't become unidimensional art chic; it'll remain lively." The Ansel Adams Center was a Yerba Buena pioneer. "We opened here in 1989, a month before the [Loma Prieta] quake," Grundberg recalls. "For a couple of years, it was pretty lonely; we were the only significant arts institution around. Then the earthquake hit and half the neighborhood fell down. You'd look out and see these vast empty lots. I really couldn't imagine what this supposedly wonderful area was going to look like." Attendance has doubled since SFMOMA opened two blocks away.

Even as a ten-day party fever overtook the Bay Area during SFMOMA's opening celebrations, trustees were reminded that a measure of amused scorn walks hand-in-hand with civic pride in the City by the Bay. While the museum's massive, planar facade, created by Swiss architect Mario Botta, became the city's most-photographed sensation since exotic dancer Carol Doda, *Chronicle* columnist Herb Caen apologized for saying its eye-catching oval skylight looked like the funnel on a cruise liner. "The building looks more like a giant toaster extruding a cheese Danish," he corrected.

Others compared the architecture to a gigantic air ionizer or a linebacker lurching downfield. The *New York Times*' chief art critic, Michael Kimmelman, observed that the "forbidding and theatrical lobby might belong to an office tower or mall, instead of a museum," while *Time* magazine's Robert Hughes wondered: "Why a whole ground floor without any place to hang a picture or put a sculpture?" For weeks, the running joke around town was that the whimsical steel-mesh indoor bridge on the fourth floor would allow bored patrons to peek under the skirts of unsuspecting ladies traversing the bridge toward the Sigmar Polke paintings.

Aurobora Press owner Michael Liener reviews monotypes made by Bay Area artist Mark Perlman.

*A golden glow in expansive spaces*

The bunkerlike brick facade does make SFMOMA the sort of building one approaches with a purpose. There's no sense of casualness in its exterior; you'd better know why you're pressing forward through those chrome doors. Botta himself likened his design to that of a cathedral, and it's easy to see why, once you're past the authoritarian, pin-striped-suit lobby. Four levels of galleries are roofed with skylights that seem to catch fistfuls of heaven, tossing chunks of golden glow into the expansive spaces. Here, old familiar pieces from the permanent collection seem to breathe a sigh of relief, liberated from the cramped hallways of the War Memorial.

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The focus is inward, contemplative, an esthetic fortress against the intrusion of a noisy world.

Just across the street, the Center for the Arts at Yerba Buena Gardens is the yin to SFMOMA's yang. In contrast to the heaven-reaching museum, this gallery is happily earthbound, surrounded by open space. Children chase one another on the green swathes of lawn. An artificial waterfall spills over a memorial wall dedicated to Martin Luther King jr. Sculptures appear in unexpected places: a glass boat hull rises out of the ground; a bronze businessman strides forward, shaky hand extended in welcome (p. 61). Checkerboard-topped stone tables hint of lively games of street chess. "Fumihiko Maki designed the building to be open and glassy," says artistic director Renny Pritikin; "he wanted people walking down the street to see it and say, 'Let's go in.'"

Proximity has encouraged a new sense of collaboration among the neighborhood's various arts facilities. "We're working with SFMOMA on a traveling exhibition of work from Japan that we'll show together this summer," Pritikin says. "They actually called us to say they wanted to get this show, but their galleries were committed and they needed space, so would we go in with them? It wouldn't have happened if we weren't right here."

Even the city's most-alternative arts organizations are enjoying a bigger voice in the cultural dialogue now that SoMa is turning into San Francisco's SoHo. In April, the LAB and the San Francisco Camerawork gallery, two small nonprofits, expanded their annual conference on "Feminist Activism and Art" by renting the Center for the Arts theater at a special nonprofit rate and holding workshops at SFMOMA. "The museum helped sponsor us by donating rooms and the use of video equipment," says the LAB's Michelle Rollman. "It felt good to be involved in this larger arts community."

The museum appears to be making up for not including more local arts in its opening shows, a slight noticed by *Time* magazine's Hughes. ". . . strangely enough it is relatively weak where it should be rock solid—in San Francisco art," he wrote. "The uninitiated visitor would hardly guess how strong a creative center San Francisco has been over the past half-century." At Haines Gallery, Todd Hosfelt and Cheryl Haines decided to make up for the oversight by organizing "Counterspace," cutting-edge installations by local artists scattered in five locations around SFMOMA. "People were coming to the SFMOMA opening from all over the world, and we wanted them to see that there were a lot of emerging artists and cultural developments here that were very strong," Hosfelt says. For one installation, artist Rob Craigie turned an empty coffeeshop into a "mad scientist's laboratory" of beeswax beakers; for another, Maria Fernanda Cardoso created a "weird river of piranha fish with bulging fake glass eyes" in a storefront display space.

"Counterspace" has sparked the kind of fervent discussion that characterizes San Francisco and, moreover, the very spirit of modernism. "Any time you see that much energy, money and resources going into an institution like SFMOMA, it's a huge morale boost," Hosfelt says. "It's saying the arts are vital. We're offering art that is more daring than what the museum might show. And SFMOMA curators do come to our shows and occasionally purchase something." Over at SFMOMA, chief curator Gary Garrels agrees. "It's those fractures, those schisms, those uneasy tensions that create new visions," he insists, slapping a palm on his desk. "We can't be the only game in town. It would be deadly."

Waterfall at Yerba Buena Gardens leads the eye to SFMOMA, sitting as comfortably as a ship tied alongside.

# One thousand and one ways of saying Uncle

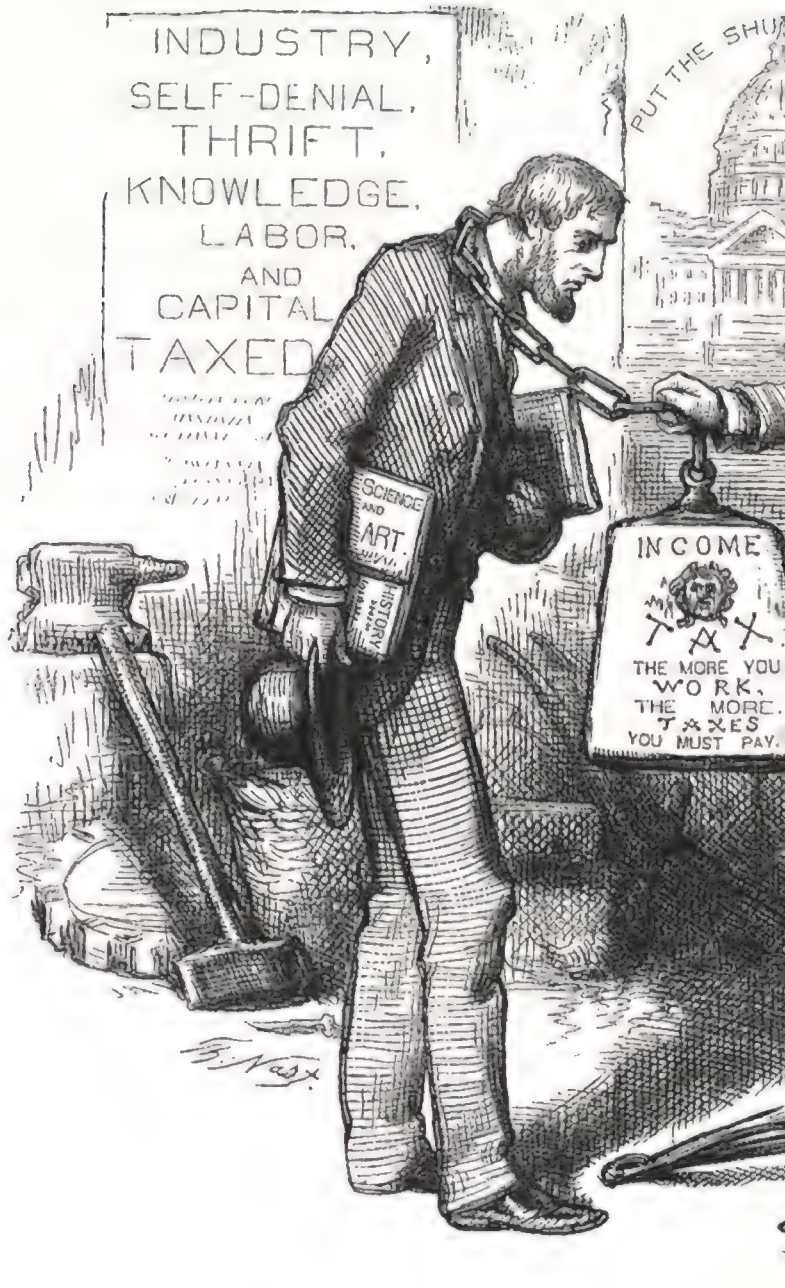
*Sam meddles shamelessly in U.S. politics and carries on with Miss Liberty, but nobody knows for sure exactly where he came from*

Along with thoughts of beer and fireworks, Uncle Sam generally comes to mind around July Fourth. Early in the 19th century this cranky, imperious geezer somewhat incongruously became the symbol of the brash young republic. Some say the name came from government supplies stamped "U.S." during the War of 1812. Others claim that a meat packer from Troy, New York—Sam Wilson, known to friends as "Uncle Sam"—sold beef stamped "U.S." to the Army, and word got around.

Whatever happened, the figure that goes with the name apparently evolved from a Revolutionary War cartoon character named Brother Jonathan, a moralistic Yankee with a tendency to lecture folks about improper behavior. Sam got his beard in 1870 in *Harper's Weekly.* Eventually a series of gifted illustrators and acute political cartoonists, from Thomas Nast to James Montgomery Flagg to England's famed David Low, took over.

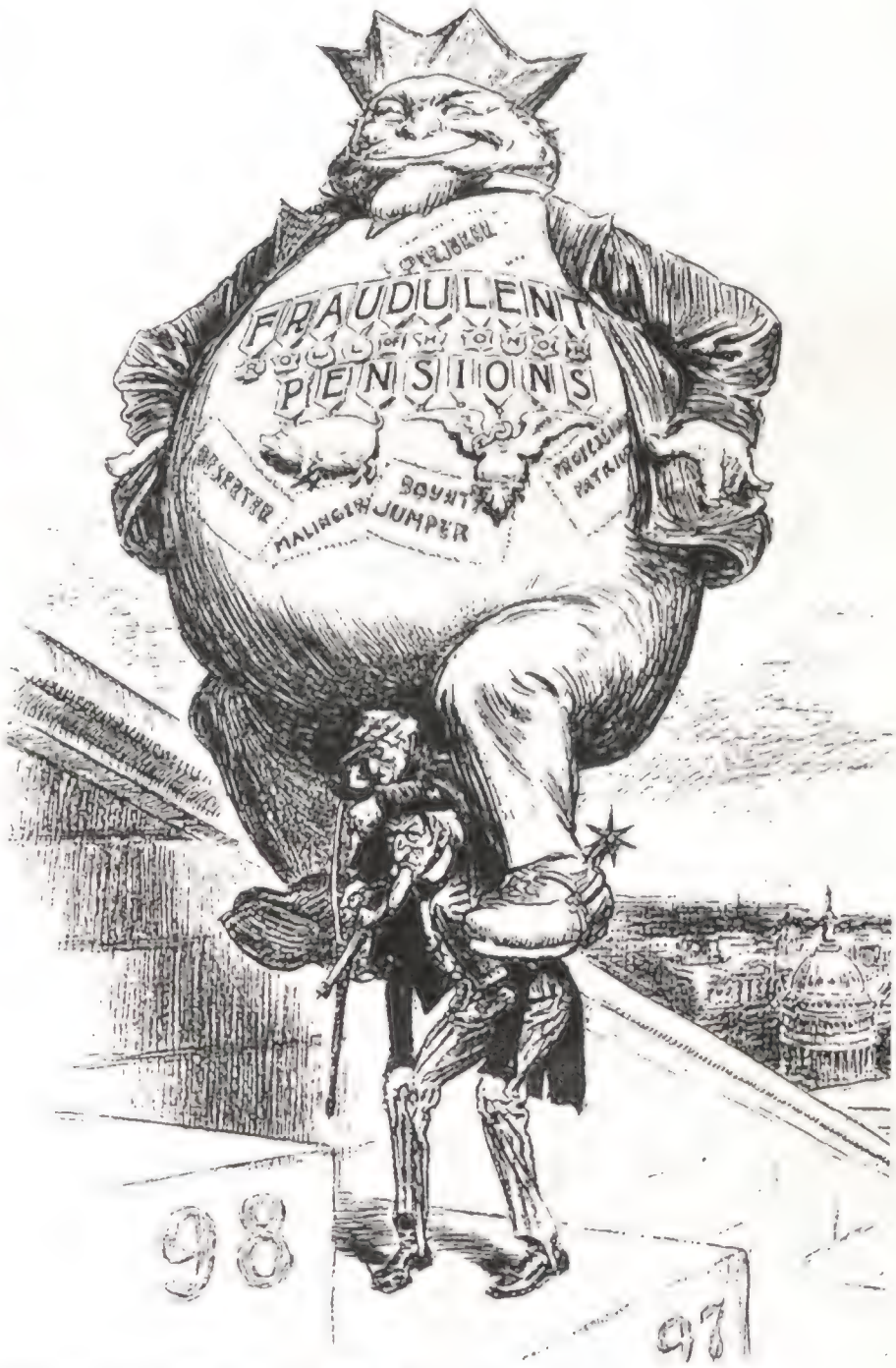
As the pictures on these pages show, Uncle Sam has been busy ever since: consorting with Miss Liberty, exhorting young men to join the colors, lamenting the size of the national debt, even setting out in *National Comics* with a kid called Buddy to foil the dastardly schemes of Nazi malefactors intent on doing the nation harm. Once they got with the program, Americans, with a little help from our history, did not spare the horses in trying to invest this unpromising scarecrow figure with every imaginable, and therefore often contrary, virtue. He is "the composite of the wildcat and the cooing dove," Gov. Robert Taylor of Tennessee declared in 1897, "as brave as Caesar and as meek as Moses. He is boss of the Western Hemisphere, Sheriff of Cuba [and] he wears . . . the scalp of Mexico in his belt."

*Sam Connery*



Classic "I Want You!" recruiting poster (detail) from World War I was painted by handsome James Montgomery Flagg, who used himself as a model.

Thomas Nast, in 1878, showed Sam trapped in a taxing situation: while liquor has been freed of tariffs, thrift and industry are to be chained to income taxes.



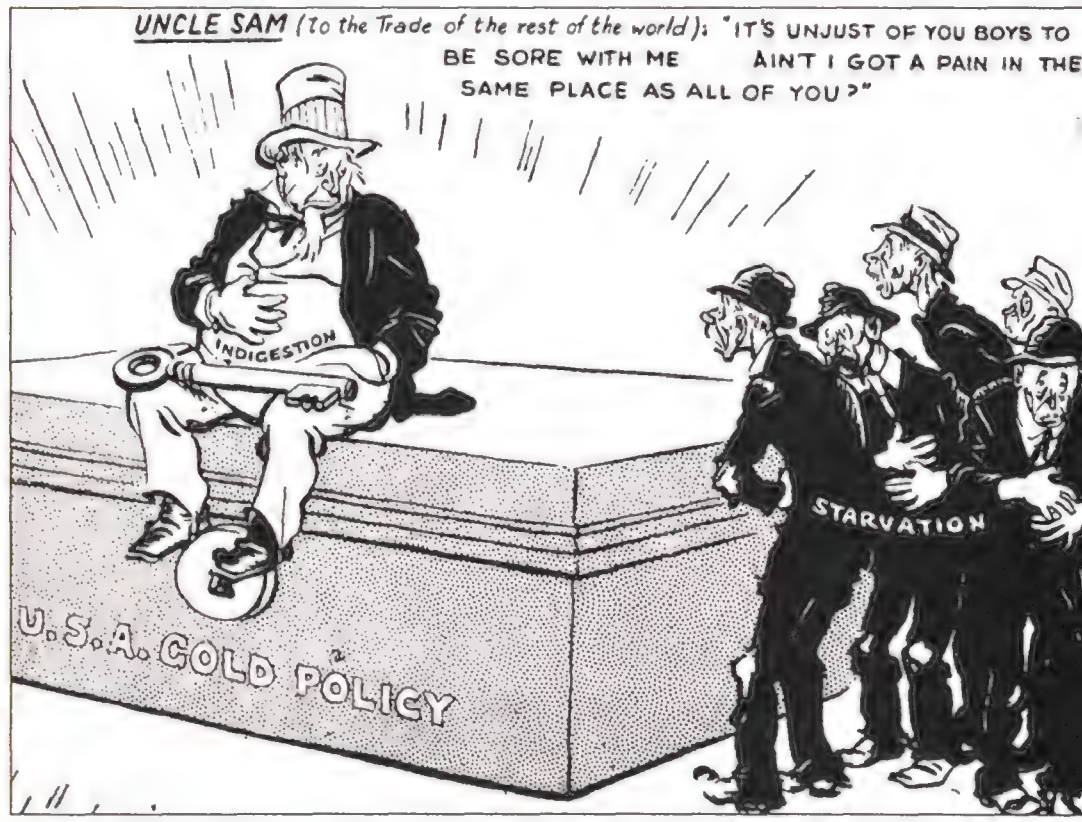

In *Harper's Weekly* in 1898, Sam struggles beneath the weight of a bloated figure representing pensions for "perjurers, deserters, malingerers, bounty jumpers."

WHOSE COUNTRY IS THIS, ANYHOW?

In the wake of World War I and a certain amount of industrial sabotage, an irate Sam gathers up fistfuls of bomb-tossing Reds and rabble-rousers.

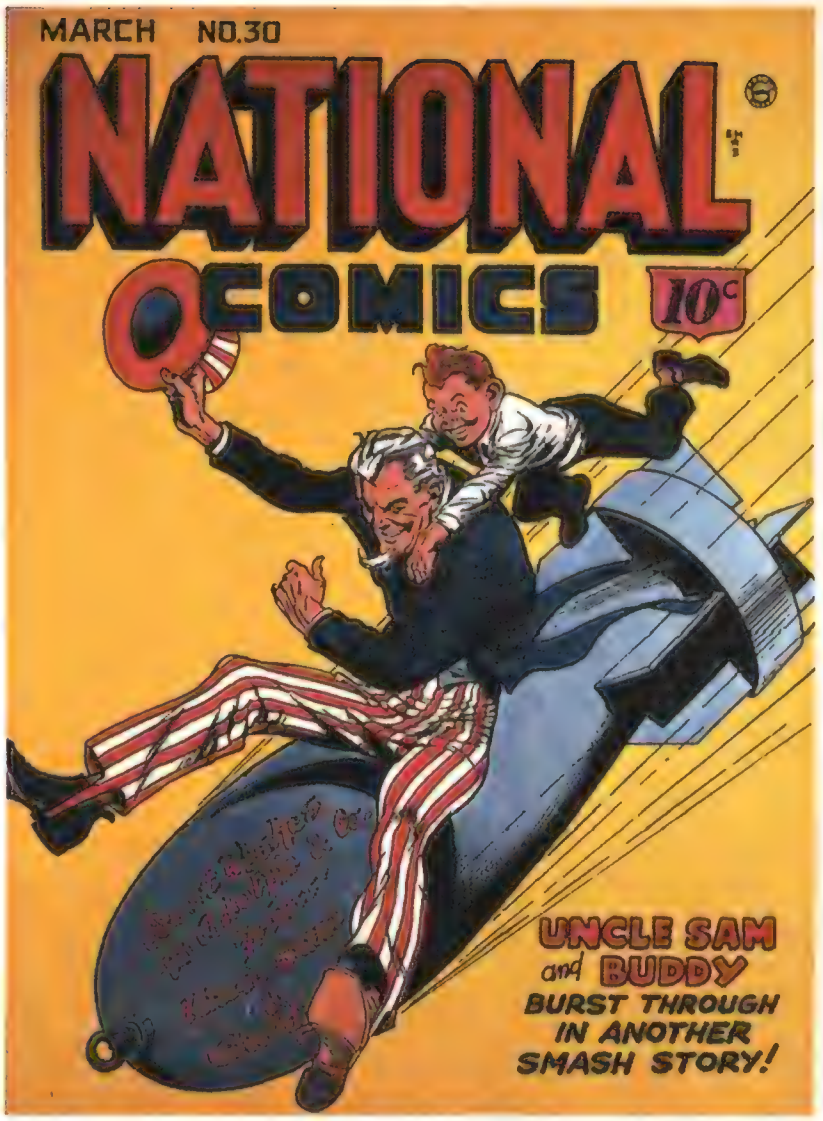
Star-spangled Sam, rising from puffs of factory smoke, rolls up his sleeves to inspire U.S. industrial output during a crucial moment in World War II.

Haig & Haig linked Sam and Miss Liberty in 1928—a wry attempt to sell Scotch to the mainly bourbon-drinking American public.

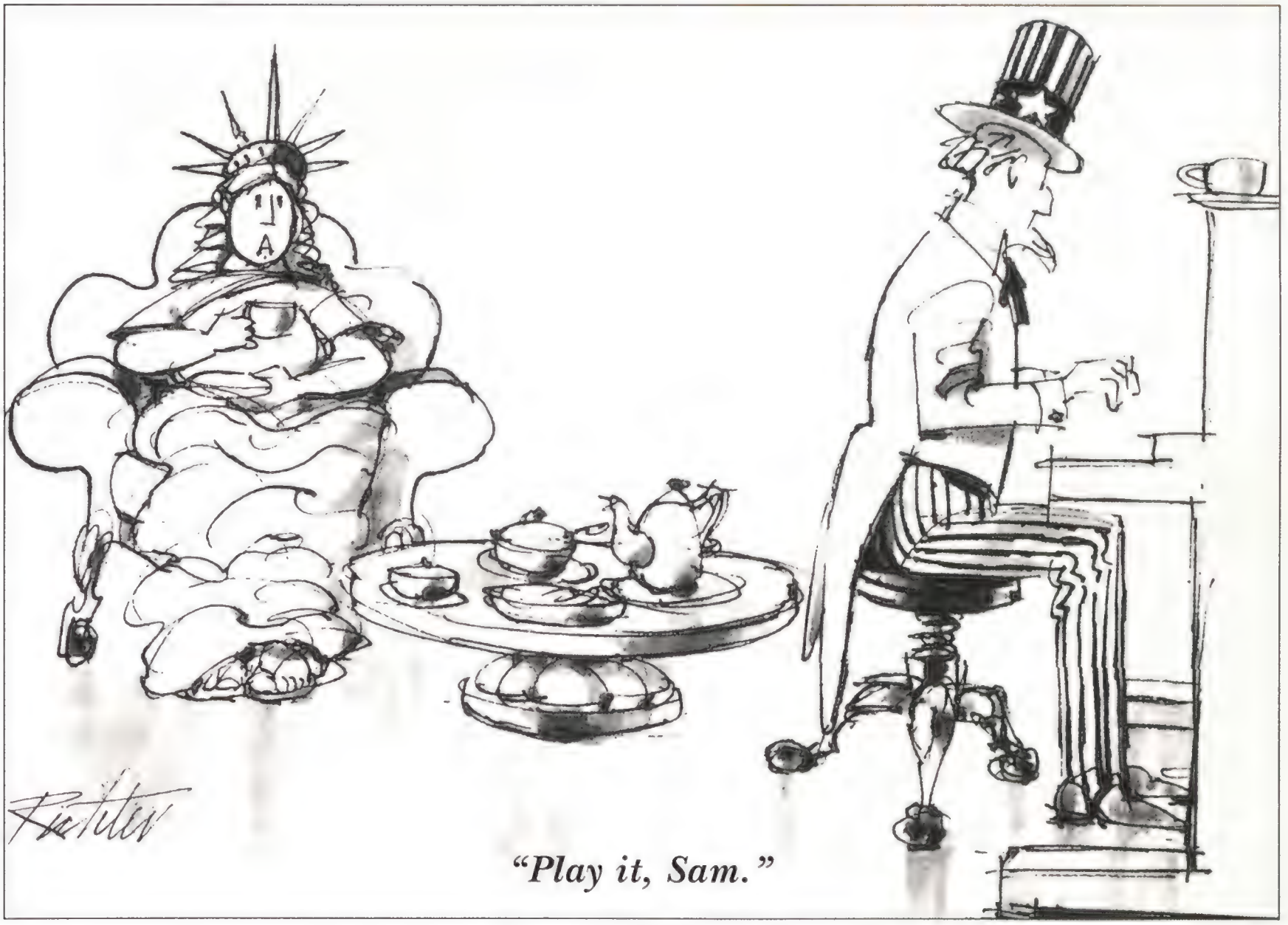

UNCLE SAM (To the Trade of the rest of the world): "IT'S UNJUST OF YOU BOYS TO BE SORE WITH ME AIN'T I GOT A PAIN IN THE SAME PLACE AS ALL OF YOU?"
INDIGESTION
STARVATION
U.S.A. GOLD POLICY

English cartoonist David Low shows a dyspeptic Sam indifferent to Depression-era Europeans broke from paying (or not paying) U.S. war debt.

Sam and WWII Allies get the worst of the partition of Germany into East and West in an early Cold War cartoon. History proved the assessment to be wrong.



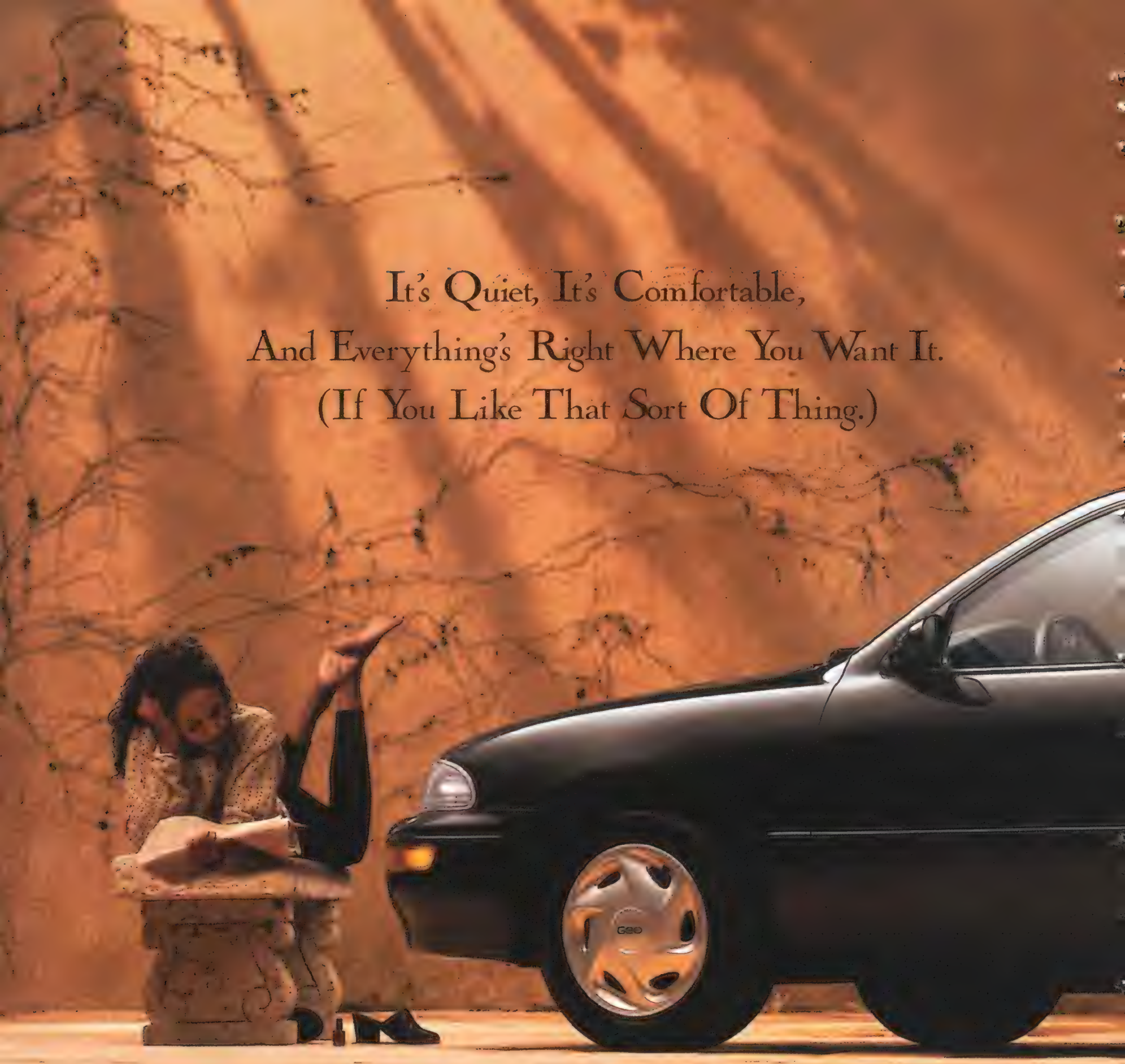

With Buddy clinging to his neck, a youthful Sam blithely rides a 1,000-pound bomb to earth in a memorable comic book cover done by Will Eisner.




Subtlety, rarely used in Sam cartoons, marks a 1992 *New Yorker* portrait of the domestication of Sam's lasting relationship with a now frumpy Miss Liberty.

Drawing by Richter; © 1992 The New Yorker Magazine Inc.

It's Quiet, It's Comfortable,
And Everything's Right Where You Want It.
(If You Like That Sort Of Thing.)

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*By Richard Conniff*

# When it comes to the pesky flea, ignorance is bliss

*You don't really want to know how good this amiable little vampire is at what it does, do you? You do? Well then, read all about it*

A flea under a microscope looks, at first glance, a bit like Wimpy, the celebrated moocher in the Popeye cartoon who used to say "I'd gladly pay you Tuesday for a hamburger today." Through the lens, the glossy, amber freckle of flea comes into focus: it is a hog-backed, round-bellied, no-neck sort of insect, dim-looking, with combs and palpi that droop down over its mouth like a mustache.

The flea is of course also a moocher. Over 100 million years, fleas have evolved, sometimes on bizarre lines, to find their victim, leap on board, slip deftly through feather or fur, and bite without being harrowed up by angry beak, finger, fang or claw. The flea has made humans, along with a variety of other unfortunate birds and mammals, its hamburger.

Modern life makes this pleasant to forget. But for much of our history as an ostensibly civilized species, humans of all classes were routinely flea-ridden. The flea, in the words of one old poem, was "born to range the merry world / To rob at will the veins delectable of princes . . . To lie with ladies, and ah fairest joy, / On infants' necks to feed."

Moreover, by some quirk of human psychology, the flea became not just our parasite but our companion, an amiable little vampire. The louse, its fellow vermin, was just a louse, a victim perhaps of human attitudes about creeping versus leaping. But the flea burrowed into our hearts. "Don't you like fleas?" an eccentric Englishwoman inquires, in one old entomology textbook. "I think they are the prettiest little merry things in the world. I never saw a dull flea in my life."

Today it is possible to go through life without seeing any flea, much less a dull one, largely because our houses are drier and more likely to be vacuumed clean. But even as fleas have become less familiar to the unbitten public, their way of life has opened up to the small, brave band of scientists who study them. For about a century now, we have known that the flea can start epidemics, notably bubonic plague, that kill us by the tens of millions. The merry flea thus ranks among the deadliest animals in the world. More than itching ever did, this knowledge has motivated scientists to learn the extraordinary details of the flea's way of life.

We now know that there are more than 2,000 flea species, up from 95 known at the beginning of the century. We know how some of them perform the human equivalent of jumping over St. Paul's Cathedral in London—and that they will do it not once but 600 times an hour, if need be, for three days in a row. We know that this fleck of dust, this incarnation of all things trivial, possesses what has been called "the most elaborate genital organ in the animal kingdom" and a proportionately complex reproductive life.

We know enough about the flea's bewildering array of bristles, spines and combs that an expert can look at a flea and tell if its host is a hedgehog or a bat, is active by day or by night, lives underground or in the treetops. Researchers can examine a flea's genitalia, combs and hair, and make a pretty accurate guess about where its ancestors came from 50 million years ago. Or as an artist to the great microscopist Antonie van Leeuwenhoek once remarked on examining a magnified flea, "Dear God, what wonders there are in so small a creature."

In a lecture hall at the University of Bristol on the west coast of England, Charles Neville begins his talk on "the flying leap of the flea" with the practiced showmanship of a circus ringmaster. The entertainment to come, he promises, will touch on rubber, muscle physiology, stiff-cuticle mechanics, high-speed cinematography, evolution and behavior. Neville is a mid-fiftyish, Falstaffian academic with a gray goatee and a baggy V-neck sweater over his lingering paunch. He speaks with a dry, self-mocking humor that has been almost mandatory among flea researchers at least since Aristophanes ridiculed Socrates as a dreamer who spent his time measuring the jumps of fleas.

For a flea to jump far enough to get on board a passing cat or dog, Neville says, "you need to develop terrific acceleration, especially if you've got short little hairy legs." A flea lifts off at 140 times the force of gravity,

Magnified 200 times, a flea looks like the lobster from hell. In the flesh, so to speak, it's as big as this: •

whereas fighter pilots begin to experience discomfort at more than six G's.

The champion leaper among fleas can soar to an apogee of about ten inches, cartwheeling toward its host with its legs extended like grappling hooks. The flea at this moment becomes a sort of acrobatic assault trooper, flinging itself at the hairy, windswept flanks of its target. More often than not, it lands back on the ground, often facing the direction from which it started just 1.2 milliseconds earlier. Then it does the same thing over and over again. It was this prodigious energy that figured some years ago in the popularity of flea circuses. Harnessed to miniature carts and wagons, the star performers' tireless leaping created the illusion of "trained" acts.

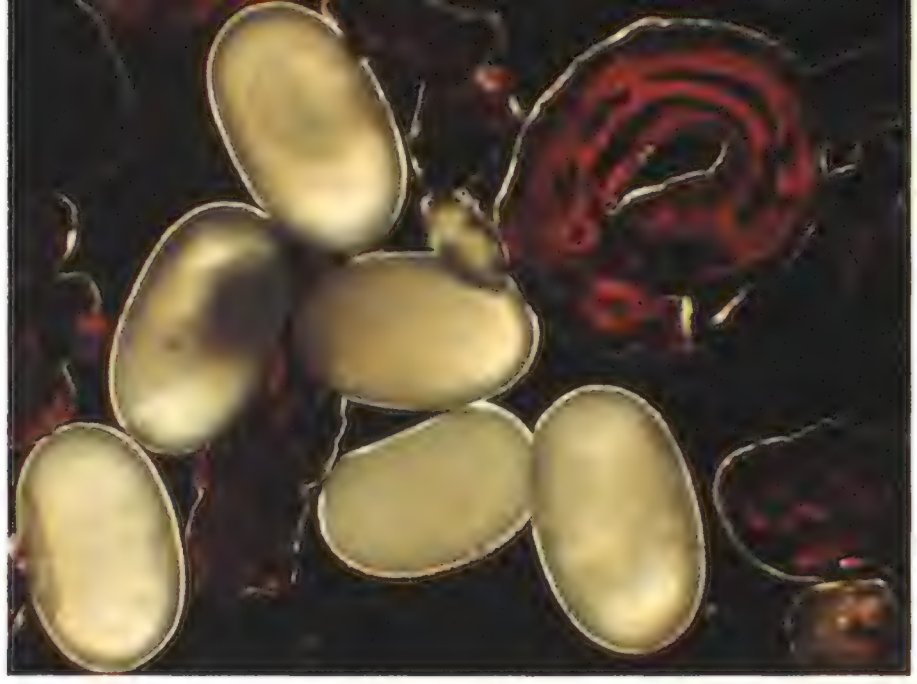
Filmed at 3,500 frames a second, the leap takes up just seven frames of film. But even the fastest muscles known to science don't twitch that fast. So in the late 1960s, Neville became part of a team organized by British flea expert Miriam Rothschild to figure out how fleas do it. On the overhead screen, Neville projects a microtome slice of flea, with a spot stained bright red at its midsection. "The colored-in area is the resilin," Neville explains. He admires it a moment. "I love coloring in. It's the only thing I'm good at."

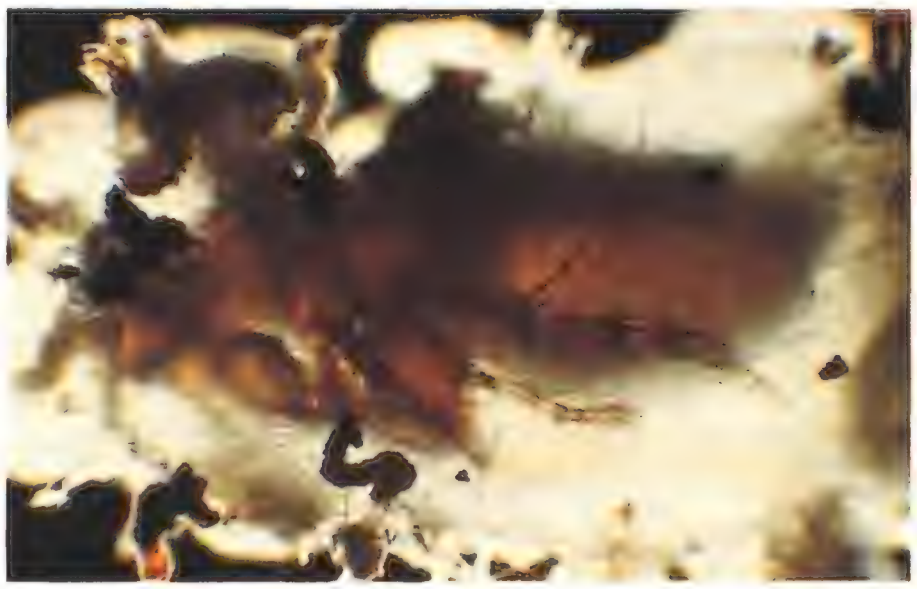
Resilin, an elastic protein, is the most efficient rubberlike substance known. A resilin ball dropped from 100 feet, Neville notes, would bounce back to 97 feet (versus 85 feet for ordinary rubber). Resilin is common in insects, particularly as part of their flight systems. The thinking, says Neville, is that fleas evolved from winged insects, such as scorpion flies. But as they adapted to feeding on blood, fleas figured out that flying around looking for a meal was a waste of energy; natural selection instead favored fleas that waited patiently in the host's nest. Thus 74 percent of flea species are parasites of rodents, and another 6 percent specialize in birds. Here is how patient they have become: the Antarctic flea has evolved to wait nine months, surviving under several feet of snow and ice, for its host, a petrel, to come back to the nest. Fleas gradually lost their wings, which got in the way as they foraged through nests, feathers and fur. But the resilin from the old flight system survived and became the driving force of the flea's flying leap from nest to host and back again.

Many fleas have a resilin ball sandwiched between plates of ordinary cuticle on each side of the thorax, above the back legs. "The flea crouches like an athlete in the blocks," Neville says, crouching for emphasis, "and the muscle contraction top-to-bottom squashes the two balls of resilin on right and left." The flea is thus cocked and ready to fire, with all the energy compressed in its resilin.

The trigger that sets it off is a single, central catch in its underbelly, which holds the thorax in the squashed-down position. "All you have to do is release the catch, and the energy is released from the legs," Neville says. He leaps, achieving an apogee of about one and a half inches. Actually, he notes, the flea accomplishes its vastly more spectacular leap from its knees. Moreover, it can repeat its leap hundreds or even thousands of times an hour because it possesses what he calls the fastest single-twitch release mechanism of any organism.

But evolution is a wondrous and sometimes consoling phenomenon, and many flea species are no more adept at leaping than Neville himself. Fleas tend to be extraordinarily specialized. The flea that parasitizes shrews, for instance, would turn up its nose, if it had one, at a mole; likewise a swallow flea, even when starved, will not feed on human blood. Each flea species is also adapted to its host in the amount of resilin it possesses: a rat flea might overshoot its target if it jumped as high as a cat flea. Some bird fleas don't jump at all. Evolution has taken away their resilin altogether, explains Neville.





Pearly eggs of cat fleas (above) hatch into larvae that can live on reddish blood excretions deposited by adults. Below, a pupa grows in cocoon spun by a larva.

*Richard Conniff, who profiled Frederick Douglass in February, got the itch to do research on fleas while seeking to discourage his children from getting a cat.*

Tumbling through space, a flea soars above hair on an ermine's back. A rubberlike ball on each side of its thorax, above the back legs, enables it to perform the human equivalent of jumping over a tall building.

Bat fleas also possess no resilin. But their young typically develop amid the guano on the floor of a cave. So they've evolved elongated legs to climb the walls back up to where the bats roost. One bat flea in Southeast Asia actually hitches a ride to the top of the roost on the back of an earwig; from a single earwig, researchers have recovered 41 fleas, jostling and lurching upward like bus riders heading home to dinner—not hamburger, in this case, but a hairless bat parasitized by both the earwig and its passengers.

Despite all this specialization on other unsavory hosts, we humans don't have a flea species to call our own. Primates generally lack permanent nests where fleas can breed, and while people are the exception, we are relative newcomers to domestic life. We are also adept at cracking fleas between our fingers.

The 20 or so flea species that readily feed on us do so largely because of the company we keep. The so-called human flea, *Pulex irritans*, actually evolved to feed on pigs. The flea implicated in the spread of bubonic plague, *Xenopsylla cheopis*, feeds mainly on black rats (SMITHSONIAN, February 1990). When humans complain about fleas now, we usually mean *Ctenocephalides felis*, the cat flea, which feeds promiscuously on cats, dogs, civets, hedgehogs, humans and, in one case, even lizards. The cat flea is flourishing because it is more tolerant of our cleaner, drier modern housing. Meanwhile, the human flea has suffered a huge decline—the end of an arguably beautiful friendship.

To any cat- or dog-owner who has ever come back from vacation only to have the house spring to life with a *boing*, it may seem loopy to suggest that humans now live in some sort of flea-free paradise. In the United States alone, fleas remain the maddeningly elusive object of a billion-dollar-a-year business in flea collars, powders, pills, dips, shampoos, pesticides and other products. But for the first time in our history, having fleas is a choice, an intermittent byproduct of keeping pets, rather than an inescapable fact of human life.

The marks of our old forced intimacy remain embedded in the language. We go to flea markets, and our football teams execute flea-flicker passes. We talk about flea-bitten ideas and fleabag hotels. But we seldom think about real fleas, and the itch of their incessant biting no longer pricks at our flesh, much less our sanity.

Flea-picking etiquette was never part of the schoolboy

Robert Traub, who has studied fleas for more than 50 years, projects microscopic images onto video screens. Fleas have been around for such a long time, he uses them as clues to the movement of continents.

curriculum of George Bush or Bill Clinton, as it was for George Washington. (He had to copy out rules for the education of a French princess, advising good little children not to claw at their fleas in public.) "Flea brown" coats were never a fashion for Nancy Reagan. Queen Elizabeth II of England has surely never had occasion, as Queen Christina of Sweden did in the 17th century, to devise a miniature cannon for killing fleas.

So the modern mind boggles at the attempt to understand how intimate we once were with the flea. It is a bit like Zsa Zsa Gabor suddenly coming face-to-face with an odious stranger who turns out to have been husband number two (or was it four?). Who would imagine now, for instance, that women once wore flea traps in their undergarments, in lieu of more sporting forms of flea hunting? An 18th-century illustration shows a small ornamented cylinder hung from the neck, with perforations in the sides; it probably had a sticky pole or some other bait in the middle to trap little invaders. Small furs also served as flea traps, and some writers have theorized that the lapdog became popular not so much to amuse the fond owner as to divert the owner's fleas. It was the canine equivalent of a flea remedy employed by ancient Egyptians: smear a slave with asses' milk and stand him in the corner until he's well bitten.

The flea was such a standard part of our lives that it could serve even as our romantic surrogate. For all our well-known modern depravities, we may be too innocent now to imagine this. But men once wooed women with poetry about their fleas. A seduction poem by John Donne is the most famous: "Marke but this flea, and marke in this / How little which thou deny'st me is, / It sucked me first, and now sucks thee. / And in this flea our two bloods mingled be."

Lesser poets imagined themselves as a flea dallying across the soft landscape of a lady friend's person. Indeed, a whole literature of entomological erotica developed around the flea. The 19th-century *Autobiography of a Flea*, for instance, begins with the narrator "engaged upon professional business connected with the plump

white leg of a young lady" and proceeds predictably from there. Even the staid Victorian novelist W. M. Thackeray celebrated an unseemly delight in fleas in a limerick about a "perverted old man of Tabreez." According to Brendan Lehane in his book *The Compleat Flea*, the flea served amorous humans as a convenient pretext, "an initiator of itch and fidget and ticklish desire." Also, it was easy to rhyme.

Happily, science now suggests there was an element of truth in the flea's ribald reputation. Its reproductive life is complex. Fleas mate with the female on the male's back. The male's sexual parts, which may occupy about a third of his body length even when coiled up within his abdomen, are equipped with spines, lobes and, in some species, tickling devices resembling feather dusters or willow catkins. Within the female's body, the male's sex organ must follow a meandering route, with the possibility for several wrong turns, to the point where the sperm will be deposited. Penetration alone can take well over ten minutes, and the male may employ a repertoire of tapping and stroking, as well as outright bondage, to get the female to stay put.

A single act of copulation can last three to nine hours. It is an act worthy of an epithalamium sung by a chorus of virgins, but a verse from Cole Porter will have to suffice: "Birds do it, Bees do it,/ Even educated fleas do it,/ Let's do it, Let's fall in love." *

Sex among fleas is, however, even more highly educated than all of this would suggest. As part of their specialized adaptation, some flea species have become finely attuned to the body chemistry of their host. Some bat fleas, for example, seem to detect a seasonal change in the female bat's hormones and climb on board just before she departs from her winter roost.

Most fleas mate only after they have first fed on blood from a suitable host, and rabbit fleas take this dependency to a remarkable extreme. They can't breed unless their host gets pregnant first. So the fleas become eager participants in rabbit romance. The moment boy and girl rabbit lay eyes on each other, their ear temperature shoots up, inadvertently signaling the resident fleas that the party is about to begin.

Fleas assemble on the pregnant doe's ears. There, ten days before she gives birth, they pick up a burst of hormones from her blood. These hormones trigger the fleas to reach sexual maturity just as the rabbit is about to give birth. A fresh burst of hormones causes the fleas to migrate to the rabbit's face and from there to her newborns, where a flea orgy is soon under way.

Over the next week, each female typically drops a total of about 50 pearly little eggs onto the floor of the nest. The adult fleas feed voraciously on the young rabbits and excrete a rain of half-digested blood. Their offspring need this food to develop through the larval and pupal stages. This is one reason fleas favor nest- or

Ivory flea trap once worn by fashionable ladies is in Traub's collection at his home in suburban Maryland.

Traub keeps 20,000 flea specimens preserved on slides catalogued in these handsome hardwood cabinets.

**Let's Do It*, words and music by Cole Porter © 1928 Warner Bros. Inc. (ASCAP) (Renewed) All rights reserved. Used by permission. Warner Bros. Publications Inc., Miami, FL 33014

Dwarfed by stalklike hairs, a flea that has evolved specifically to parasitize rabbits feeds off its host's ear.

home-making hosts. Despite popular lore, fleas aren't everywhere, out breeding in the front lawn. They are far more likely to breed around the dog's blanket or the cat's favorite rest spots, where adult flea droppings have accumulated. In the case of rabbit fleas, timing their reproductive cycle to the host's not only guarantees that juvenile fleas will be in the right place at the right time, with an ample food supply; it also provides a dispersal mechanism. The new generation of fleas grows up just in time to ride out to greener pastures on the backs of the young rabbits.

The researcher who described this extraordinary hormonal synchrony was Miriam Rothschild, and it put her in mind of the old lore that fleas attack women more often than men. Traditional sources attributed this preference to the more delicate skin and more sensitive nature of women. "Perhaps this is faulty reasoning," Rothschild wrote, "and the truth of the matter is that the human flea (*Pulex irritans*) also responds to the attraction of the ovarian hormones. This is food for reflection." Thus poetry and the romantic flea may have shown the way where science now follows.

What is an unfortunate flea-bitten female to do? At least according to lore, no animal is more clever than the fox at getting rid of fleas. When sorely bitten, she is said to back slowly into a stream, while clutching a patch of moss in her teeth. Her fleas scramble toward her snout to escape the rising flood. Finally, even the fox's nose descends, and the desperate fleas leap toward the safety of the moss, floating before them like a lifeboat. The fox then releases the moss, utters a satisfied "Ah" and swims back to land. It is a lovely myth. Unfortunately, it neglects to mention that when the fox returns to her den, a new generation of fleas will leap with a gratified "Ah" to reinfest her.

Real animals must work to get rid of their fleas, often gnashing desperately at their own flesh. Bad as it looks, this kind of grooming can be moderately effective at reducing the flea population. In one study, a mouse pruned its entourage down from 50 fleas to 14 in a week. But when you scan the literature and see that researchers have collected 440 fleas from a single cat, 932 from a hedgehog and 7,000 from one miserable sheep, it becomes clear that fleas are also immoderately effective at holding on.

In Robert Traub's modest brick home in Bethesda, Maryland, the centerpiece of the dining room window is a stained-glass image of a flea. Of necessity, it lacks most of the minute features of flea anatomy that enable the flee to hold on to its host, details that fascinated Traub for much of his career in the military and later at the University of Maryland Medical School. "I worked on the epidemiology of insect-borne diseases and on control of disease vectors," he says. But even when his jobs took him in other directions, Traub has been obsessed with fleas—and particularly with their combs, bristles and spines, their helmets and false helmets, their marginal tiaras and crowns of thorns.

Traub is a crusty figure in his late 70s, lean and bent, with a knife and a penholder on his belt as if he were still out doing field work in New Guinea. He wears big, black-rimmed bifocals, and a magnifying glass hangs from his neck. He shuffles down the narrow alleys of his basement, which is stacked to the joists with fleas. It is the second-best flea collection in the world, he says, after the one at the Natural History Museum in London that was built up over the past century by Miriam Rothschild and her father, Charles. Traub pulls open a drawer of a specimen cabinet and mutters, "Oh, this is an interesting one," then moves back to his bench with a flea neatly preserved in yellow Canada balsam on a microscope slide. He puts it into a microscope and projects the magnified image on a video monitor.

*How the New Guinea flea holds on*

The specimen is a New Guinea flea that parasitizes a giant rat the size of a dog. The flea has a narrow, keel-like head for slipping easily between two adjacent hairs, and a bizarre extrusion called a "crown of thorns" at the back. The crown is perfectly adapted, Traub remarks, for hooking on to the hairs almost unshakably until the flea, in its own sweet time, is ready to move forward.

He puts up another slide and indicates a row of spines lined up at the back of a flea's head like teeth in a comb.

LENOX

# GUY COHELEACH'S ROYAL CATS

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*Ambush in the Snow*

*Cat Nap*

*Rocky Mountain Puma*

*Rocky Refuge*

*Lion in Wait*

*Jungle Jaguar*

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Plates shown smaller than actual size of 8 1/4" in diameter.

*Afternoon Shade*

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"Dressed fleas" are made by mounting fleas as "heads" on miniatures that are less than a quarter-inch tall.

"Flea people always acted as if these combs were there to help them with taxonomy," Traub says. "They never thought about whether they were useful to the flea." Charles Rothschild was the first to suggest that the combs were a means of hanging on to the hairy flanks of the host. "He presented the analogy that it was like throwing a rake into a tree. The teeth hang on to the branches, and the rake won't fall down."

Over the past 30 years, Traub has taken the analogy much further, pointing out that, as part of their extreme specialization, each flea species seems to have adapted its rakes to the branches of its particular host. On his video monitor, Traub throws up a dizzying series of fleas to demonstrate: a flea with its comb teeth flared out at the tips to get a scissors-grip on the thick, coarse hairs of a hedgehog; a flea with narrow, evenly spaced comb teeth for the silky hairs of a mole; a flea with six or eight combs on its back, the better to hang on to a bat as it swoops and dives through the night sky or migrates across half a continent. "As life becomes more hazardous over the eons," Traub explains, "the fleas get more combs, more spines. We're at the point now where we can look at a flea we never saw before and tell you about the behavior of its host."

Traub also looks at fleas for evidence about the geological past. The types of fleas on Madagascar, for example, indicate to him that the island was once much farther north, probably off Somalia. The discovery that rabbit fleas in North America are attuned to their hosts in the same way as the rabbit fleas Miriam Rothschild studied in England suggests to Traub that this adaptation dates back 50 million years, to a time when Europe and North America were not so far apart. The similarity of the fleas on marsupials in Australia and South America led Traub to argue in 1968 that marsupials and their fleas island-hopped between the two continents, via Antarctica. This apparently absurd idea, along with the whole theory of continental drift, is now widely accepted because of new evidence on plate tectonics. Traub's observation may take the prize in the category of seeing the world in a grain of sand. His ideas about 100 million years of coevolution between fleas and their hosts emerge as he browses the drawers of his collection. He puts another slide in the microscope, caught up now in the wonder of fleas. But it is time for his visitor to leave.

On the other side of the ocean, in a back room at London's Natural History Museum, a research assistant named Theresa Howard is addressing the only wonder most people think to accord the flea: wondering how to get rid of it. "This is a classic inquiry," she says, indicating a letter she has lately received together with a plastic bag of dog hair and flea. "'My dog has fleas. Here is the flea. What is it? How do I get rid of it?' I get these pulverized messes that used to be insects." But Howard is diligent. She wanders down the vast Rothschild collection of fleas, in their mahogany cabinets smelling of crushed naphthalene. Among other wonders, the collection includes a slide of a small plug of human flesh with a chigoe flea at the center, neatly labeled "from inside the ball of the great toe of Capt. G. Hyde, S.S. *Malvsen*, 1896." The collection also includes a series of Chiclet-size boxes containing tourist souvenirs from a more flea-bitten era in Mexican history: *Pulgas vestidas*, or "dressed fleas" (above). Actually that's a misnomer because fleas usually serve only as heads on the tiny, meticulously attired figures—woodcutter, drummer boy, wedding couple. The pulverized messes sent to Howard are a lot less elaborate—mostly unadorned cat fleas.

"I usually try to identify it and then I write a consoling note," she says. "'You're not alone. It isn't because you keep a dirty house,' and I try to get them to see a vet. I tell them to spray—particularly where the animal sleeps. Boil the bedding, and if it has one of those classic old wicker baskets, scrub it out with a good solution of bicarbonate of soda in water. You have to be very tactful and say all animals have fleas. You just don't notice it until you have billions." She does not remind her correspondents that fleas were old hands at their business long before humans appeared on Earth. She does not elaborate on how good fleas are at what they do. She does not remind people how lucky we are, compared with our itchy, welt-riddled, flea-perturbed forefathers or, more often, foremothers. A degree of ignorance is indeed bliss. "The most important thing," says Theresa Howard, "is to be understanding."

Touting Lyndon Johnson, a flea pulled a chariot at 1964 Democratic National Convention in Atlantic City.

LBJ

Odyssey of the Mind

*By David M. Schwartz*

# Everyone's a winner when it comes to sports for the brain

*From Los Angeles to Lithuania, children are reveling in the challenges of 'Odyssey of the Mind,' a competition that champions creativity*

"You won't have any trouble finding *our* team," Elaine Yenne told me on the telephone a week before I caught up with her at the Odyssey of the Mind World Finals. "Just look for six 5½-foot chickens."

The "chickens" were junior high school boys participating in Odyssey of the Mind, an international competition that challenges students, kindergarten through college, to find creative solutions to bizarre problems. Yenne, a teacher at Parkhill Junior High School in Dallas, served as coach for a team of ninth-graders working on a problem called "Mini Terrain Vehicles." They had to design and build several small vehicles that could circumscribe arcs, survive sand traps and speed bumps, release a smaller car carried atop one of the vehicles, flip onto another surface and keep going, and dive off a ramp into a pool of water—yet proceed apace and pop a balloon at the end of each 20-foot obstacle course. And it all had to be done for less than $90 in materials, and without an iota of adult assistance.

But chickens? You thought designing and building trick cars would be creative enough? Obviously you've never attended an Odyssey of the Mind competition. And certainly not the Odyssey of the Mind World Finals.

Because in Odyssey of the Mind—or "OM," as these tournaments are affectionately known to more than a million youthful participants in all 50 states and 20 other countries—there seems to be no limit to the amount of time children are willing to invest or the heights of creativity they are able to achieve. Electing to solve one of five long-term problems, they work as a team for months, seeking original solutions that will wow the judges.

For those who take first-place honors at local, state and national competitions, the reward is a chance to compete in the World Finals, a dizzying four-day thinkathon that looks like some kind of kooky cross between science fair, masquerade party, performing arts fest and the Olympics. "Trying to explain Odyssey of the Mind to someone who's never seen it," an OM official told me, "is like trying to explain how to tie your shoes over the telephone."

Whatever it is exactly, this thing called Odyssey of the Mind, one truth is evident from watching the 5,000 "OMers" who invaded the campus of Iowa State University in Ames in June 1994 for the World Finals: simply being creative and clever is not enough. You've got to be creative with *style.*

To the miniature-vehicle builders from Parkhill Junior High School, "style" meant finding a theatrical motif for the six mini terrain vehicles they cobbled together from wheels, gears, axles, motors, circuit boards and other parts scavenged out of discarded cash registers, copy machines and assorted junk they picked up at a local warehouse. The cars are about a foot long and, like the boys, they are dressed as chickens.

"We wanted to come up with a reason to have these cars going down these different roads," explains Mark Waterston from under his feathery headpiece, "and we thought of the old joke, 'Why did the chicken cross the road?'" Decked out as gangly "Big Chick," Waterston is the star character in a bevy of sight gags and poultry puns that the boys hatched in order to answer the famous question eight different ways, one for each course, or "road," the cars must traverse.

The clever shenanigans at one of the stations—entitled "The Flip-Flop"—demonstrate just how much ingenuity is demanded. Here the team breaks out into a game of baseball. Their car has been painted to resemble the "San Di-Eggo Chicken," a major league mascot who dives for balls. Which is exactly what this vehicle does, upending itself and flopping onto another surface. The feat is required by the specifications of the problem, and accomplished by an inspired spool-and-thread device that moves the car's center of gravity as its wheels turn, finally causing it to flip when it reaches an unstable position. Undeterred, it rides its second set of

Scenes from OM World Finals convey event's brio: (clockwise from top left) contestants march in opening ceremony; a cello-wielding one-man band; triumphant hands grasp a trophy; judges interview the creator of a mini terrain vehicle; costumed players from Florida perform; a participant from China joins in the fun.

*Photographs by John Livzey*

Finals judge Rick Rand listens attentively as chicken-impersonating teammates Philip Wong (left) and Tad Dunn from Parkhill Junior High in Dallas, Texas, explain the design of one of their mini terrain vehicles.

wheels straight into the balloon at the end of the run.

And so it goes, road after road, one chicken joke after another, until the final car has completed its course. The vehicles have popped five of the eight balloons, and the flock of 5½-foot chickens takes a final jaunty strut to wildly enthusiastic cheers (and a few squawks) from the bleachers. Another eight-minute presentation at the Odyssey of the Mind World Finals is over.

By the end of the week, more than 700 such presentations will be given, each a unique solution to one of the five problems dreamed up by OM's founder and chief impresario, C. Samuel Micklus. (His son, Sammy, also takes on the task of devising these challenges. And Micklus' wife, Carole, has played a major role in OM from its inception.) A former professor of technology and design, Micklus believes that the future belongs to those who learn creative problem-solving skills as children. The key is what he calls "divergent" thinking. It is this ability to take mental risks and explore multiple solutions to a problem that is the essential foundation for creativity. "What problems will today's second-graders face 20 or 60 years from now?" he asks. "I don't know. No one knows because tomorrow's problems are inconceivable today. So we have to encourage creativity through divergent thinking and foster the discipline needed to pursue solutions."

Stolid of face and solid of build, Sam Micklus looks more like an athlete turned banker than the designer turned professor turned creative-thinking guru that he is. Growing up in southern New Jersey, he never had an amicable relationship with conventional schooling, and he entertained no notions of higher education before his mother brought a portfolio of his artwork to the Philadelphia College of Art (now the University of the Arts). He was the first in his family and one of the first in his neighborhood to attend college, and he graduated with a degree in industrial design.

In 1975, while pursuing a doctorate in education, Micklus was struck by a study showing that teachers prefer less-creative students, and school administrators prefer less-creative teachers. "I realized this is what I'd

*David M. Schwartz, author of the acclaimed children's book* How Much Is a Million?, *visits dozens of schools each year, offering his own inspired demonstrations of creative ways to approach the teaching of math.*

been observing in schools all my life," he says, "but it was still very disturbing. So I decided to do something about it in my own teaching." As a professor at Glassboro State College (now Rowan College) in New Jersey, he assigned creative problem solving in his design class. One project required the students to create a flotation device that could navigate a half-mile zigzag course across a nearby lake—without spending more than $5.

"They sailed trash cans, paper boats and milk bottle crafts, but the device I'll never forget looked like a giant water bug. It had stiltlike legs attached to inner tubes floating on the water. The inventor sat on top and pulled a rope that moved the legs together. When he let go of the rope, the contraption would, in theory, slide across the water." A hinged flap below each foot provided one-way resistance. "Unfortunately, he fell off each time it moved, so he didn't solve the problem at all, but it was a wonderful example of mental risk-taking."

In 1978 Micklus took a risk of his own. He thought it might be fun to challenge high school and junior high students with similar problems, and groups of children from 28 New Jersey schools came to Glassboro State to present their solutions. "We were just fooling around," he says. "It was only going to be a onetime thing." But such creative good fun could not be a onetime thing, and more than 100 teams came the next year. In 1980 Bill Moyers featured OM—then called "Olympics of the Mind"—in his PBS series *Creativity*. OM took off on an exponential growth curve, quickly spreading to schools across the continent and abroad. Sometimes it is offered only to children in "gifted and talented" programs, a practice Micklus tries to discourage, but usually it is an after-school activity for anyone, coached by a teacher or a parent. Now local and state competitions are necessary to pare down the number of contenders at the World Finals. Last year more than 12,000 schools and one million children worldwide, from Kazakhstan to Australia, participated in Odyssey of the Mind.

"OM fits perfectly with the current climate in business, which is to work as a team to find new, efficient ways to do things," says Bill Jones, former director of corporate communications for Chevron. After he retired, Jones took on a volunteer position chairing Friends of OM, a group of advisers that also seeks corporate support. "Many companies recognize that their most outstanding employees are the risk takers," he says, "and they are starting to see that children who participate in Odyssey of the Mind have credentials in creativity."

Early on, Micklus wanted to find a way to honor individuals and teams that took giant mental leaps, uninhibited by fear of failure. "We're too quick to reprimand children for making mistakes," he laments, "and we forget how many great accomplishments came about because someone was willing to try and fail, many times. Thomas Edison made something like 2,000 attempts at the light bulb before he got it right!" He remembered the student who had built the floating water bug, then devised an award to encourage the same spirit of unbridled creativity. He named it the "Ranatra Fusca Award"—after a species of water insects. In Odyssey of the Mind, the Ranatra is considered a higher honor than first place.

Some schools take up OM as an alternative to science fairs, which typically reward those with the slickest displays—often a sign of parental involvement. At OM, on the other hand, judges are trained to detect adult intervention, and coaches serve largely as facilitators who keep their teams "on task"—even if it pains them to keep their mouths shut while the children struggle with a problem. When a team of vehicle builders in Palo Alto, California, needed gear reduction to help one of their miniature cars overcome a bumpy obstacle course, their coach, an engineer, had to bite his tongue. He kept biting as they invented a system that geared up instead of down. "These are very bright kids who were born in the computer age. It's not their fault, but they

At the 1994 World Finals awards ceremony, OM founder C. Samuel Micklus embraces a winning participant.

Ingenuity rules the day, whether in one contestant's artful ostrich garb or in this World Finals team's small-scale, weight-bearing, balsa-wood construction.

just haven't torn apart enough radios and bicycles and motorcycle engines," says Bill Abbott, who spent a good part of his childhood getting his hands greasy. He finally decided they needed to take a field trip—to a hardware store. "If they ask me, I can teach them principles of mechanics or electricity or how to use a hacksaw. But I can't say, 'What your car needs is lower gears and here's how to do it.'" Nor could he suggest fresh batteries on competition day. "All I could do was smile when they handed me the spare batteries instead of putting them in the cars." His smile froze when one of the cars ran out of "gas" halfway up the ramp.

Adults may be frustrated by the no-tell rule, but for children it opens up a world of possibilities. "When kids do it alone," says Kris Shearer, who with her husband, Steve, serves as state director for OM in California, "you get something none of us would expect." As an example, she points to a fourth-grade girl whose team built balsa wood structures that had to support as much weight as possible. Not knowing about the advantages of diagonal braces, the girl hit upon a different approach. "She thought the best way to keep her structure from breaking might be to soften it. So she soaked the wood in water and coiled it into a spring. When weights were placed on it, it compressed but didn't break." Unfortunately, the judges had to consider the structure broken when it compressed to the point where the weights rested on the safety bumpers, upright posts in the testing assembly. But they were so impressed with the novel solution that they awarded her a Ranatra Fusca.

"Creative problem solving is only part of it," says Sam Micklus, walking briskly between buildings on the Iowa State campus. "We're trying to teach a way of life." He smiles and shouts "Good luck!" to a sprinting dinosaur and a blue-footed booby scampering down the sidewalk. These hurried creatures are probably on their way to "Furs, Fins & Feathers," a problem that requires teams to create a humorous performance depicting the life of an animal from the animal's perspective. "To do well in OM, you need teamwork and you need persistence. How often do kids get involved with projects that take months to complete and require working well together?"

### *From Homer's Troy to the* Exxon Valdez

Working well together was the chief challenge for six fifth-graders from Blue Hills Elementary School in Saratoga, California, who tackled OM's *Iliad* problem. The assignment was to dramatize a scene from Homer's *Iliad* and segue into an analogous historical moment from the 20th century, stitching the two together in a seamless eight-minute performance featuring elaborate sets that transform instantly with the change of scene.

The Blue Hills team had talent aplenty, but patience was another matter. "At the beginning," says coach Vicky

In a segment from their dramatization based on the *Iliad*, a Connecticut team segues to the 1960s, musing on the themes of loss, mourning and the great restorative power of youth—in this case, represented by the Beatles.

Evans, "all anyone could say was, 'Hey, listen to my idea!' Now they start out with, 'Does anybody have an idea?'" When one child proposed using a sing-along tape of world history as the context for their production, everyone listened. The team built props including a giant tape recorder, and composed a minioperetta that fast-forwarded through time, showing a parallel between the Trojan War, when the river Xanthus turns red with blood, and the *Exxon Valdez* spill, when Alaskan waters turn black with oil—sung to the tune of "What Shall We Do with the Drunken Sailor?" As the spring competition season approached, they practiced as often as six times a week, and sang their way to the World Finals.

In addition to cooperation, OM begets confidence and self-esteem. It is a world of no stigma for individuality, a safe zone for the kinds of children who are ignored or even ridiculed by their peers. "In Odyssey of the Mind, kids are taken seriously by their peers, sometimes for the first time in their lives," says Mike Bledsoe who, with his wife Jan, coaches a team of students from College Park High School in Pleasant Hill, California.

The Pleasant Hill team sailed through regional and statewide competitions. The problem—titled "OM-Believable Music"—called for three original musical instruments that could be played without being touched—all within the context of a skit, of course. For a musical theme, they adapted TV's *Beverly Hillbillies* jingle, but they turned the show's plot around: instead of striking it rich, the "Pleasant Hillbillies" strike it poor when they lose their fortune in a fire and have to move from city to farm, where they make a comeback and discover that creativity conquers all. A four-foot-tall pop-up book illustrates the change of scenery as the music rings out on ingenious instruments: a circular "glockenspiel" played by the pecking motions of wooden chickens on a turntable; a "jukebox" powered by cascades of BBs and intoned when the tiny metal balls strike hollow copper pipes on a revolving spindle; and a giant "player-piano" roll driven by a motor from an ice cream maker, sounding its notes when steel bolts come into contact with chimes cut from copper pipe. Their well-received performance earned them sixth place at the World Finals.

By midmorning on the last day of the World Finals, most of the teams have already strutted their stuff for the judges. Now they can relax while awaiting the evening awards ceremony, and many retreat to shady corners of the campus to trade enameled pins emblazoned with mottoes like "Michigan OM—Great Lakes, Great Minds" and "ColoradOM." But for seven fourth-graders from the A. W. Cox Elementary School in Guilford, Connecticut, half a year of experimentation, discussion, revision and rehearsal is not quite over yet. They move their gear into a basement gym in Iowa State's Physical Education Building. Their long-term problem involves building a balsa wood structure weighing 18 grams (a little more than half an ounce) and standing between 8 and 8½ inches tall—but capable of supporting a large stack of barbell weights. When the weights finally crush the spindly wooden tower, a Ping-Pong ball inside must be released unharmed. Hence the problem's name, "Set It Free."

Dressed like construction workers in fluorescent orange vests and papier-mâché helmets, the five boys and two girls set to work. With the anxious care of infantry-

Gleaming "Ranatra Fusca" medallions, which honor outstanding creativity, are OM's most coveted awards.

men handling grenades, Seth Besse and David Ellis, aided by their coach, deftly place 25- and 45-pound weights on the latticed balsa base. (For safety reasons, an adult is permitted to help the children lift the weights.) Since fall, the team has built and broken dozens of balsa structures in preparation for these eight minutes, studying the points of weakness, refining the design. Their latest model features four overlapping X-braces on each side. At the Connecticut state finals two months ago, a precursor to this design held 660 pounds.

The level of tension in the room grows with the height of the weight stack. But Daniel Rubin ignores it. Sitting to one side, a half-size cello between his knees, a kazoo in his mouth and an electronic keyboard at arm's length, he strikes up a recognizable tune. It is "London Bridge Is Falling Down." Meanwhile, two of his teammates begin to assemble a scaled-up version of the balsa tower. In construction-worker garb, they mime hammering motions, fastening long plywood slats with Velcro to erect a second tower, this one taller than themselves.

Slowly, the big structure comes together—and, astonishingly—the small one holds together despite the imposing stack of iron disks that now dwarfs it. The weight handlers hardly breathe, fearful their respiration could jar the works. A hush envelops the gym, punctuated only by Daniel's resonant cello. *London Bridge is falling down, falling down . . .* the weight stack grows . . . *falling down . . .* and grows.

The big structure is complete. Its builders dance around it. *London Bridge is falling down, falling down . . .* the weight crew works, never looking up. The room is charged with tension. And the weight stack grows. Daniel plays furiously, switching from cello to keyboard and back . . . *falling down. London Bridge is falling . . .* Snap! Nine hundred pounds of hard black metal demolish the tiny balsa tower. Jarred by the shock, the Ping-Pong ball rolls off its cradle and out of the assembly. Spectators gasp, then begin to cheer but stop in midshout.

As if in echo, the big tower also suddenly tumbles. One of the children stoops to the floor and lifts a previously unnoticed treasure from the ruins. It is a papier-mâché sphere, an outsize mimic of the Ping-Pong ball! To the oohs, ahhs and general perplexity of the spectators, one boy cleaves the sphere to reveal a very different sort of balsa structure: it has two wings and a rubber-band-powered propeller. He raises the contraption to eye level and gently sets it free. In slowly ascending arcs, the balsa wood airplane spirals upward, circling the gym in lazy circles. Five, 10, 12, 13 revolutions, then a descent of equal grace. The effect is stunning, breathtaking, hypnotic. Everyone in the room is awed by the odyssey of young minds that has just transformed an engineering problem into a magical performance.

At the awards ceremony in Hilton Coliseum the energy level is high-voltage. Very few of these 5,000 charged-up young people will walk away with trophies, but even fewer seem to care. OM creator Sam Micklus is introduced to the packed house as "a man famous not for the problems he has solved, but for the problems he creates." When Micklus tells the OMers they are all winners, it is a statement they truly seem to believe, and the decibel level of their cheers must rival that of any Iowa State basketball game at this site.

The Cox School fourth-graders are winners in more than one way. Aside from a trophy for fourth place in the elementary school "Set It Free" division, Daniel Rubin receives an "Outstanding OMer Award" for his talents as "a one-person music machine." Minutes later, the team is called to the stage to receive a Ranatra Fusca award. "Exceptional creativity was shown in the unique and creative way the team integrated the different elements of its performance," reads the announcer. "They captured the audience's attention, and they had fun!"

For all its educational benefits, I realize, Odyssey of the Mind would be just another after-school program if it weren't so much fun. I turn to the boy behind me. He lacks trophies but certainly not enthusiasm. "Is OM fun?" I ask.

"It's better than fun," he says. "It's amazing. No, it's OM-azing!"

Contestants take a break to trade OM regalia—pins, badges and buttons—greatly prized by each participant.

அன்னை
வேளாங்
கண்ணை
துணை

*Photographs by Stephen P. Huyler*

# The decorative art of India's painted prayers

*A new exhibit at the Sackler Gallery explores the ritual paintings created by women all over India to inspire the beneficence of the gods*

A woman in Orissa (above) applies rice paste to a motif of growing rice. In Tamil Nadu a Christian (opposite) creates a powdered prayer to a local saint.

"It is dark, but the glimmer of pre-dawn light touches the eastern sky. Mari and her young daughter Sita emerge from the doorway of their mud house. They carry small metal bowls of white powder ground from parboiled rice. Mari dips an index finger into her bowl and bends to mark out a grid of white dots beneath her feet. With movements practiced, fluid and graceful, she paints the curves of leaves and vines, the loops of petals, and straight edges of stems. Eight-year-old Sita copies her technique in lines more shaky and unsure; the two sides of the pattern merge into one. It is a lotus vine—the symbol of the goddess that protects family and home, painted to encourage her beneficence and to keep evil from entering the house. The designs are quickly smudged as the sun rises and people move in and out of the house."

With these words art historian Stephen Huyler introduces his photographic tour of Indian domestic painting in *Painted Prayers: Women's Art in Village India,* a new book published by Rizzoli. Huyler became interested in these ritual artworks on his first trip to India in 1971 and has returned every year since to document them. Sixty of his images will be on exhibit at the Smithsonian's Arthur M. Sackler Gallery from July 23 to April 7, 1996.

The paintings, on walls as well as floors and thresholds, are most often prayers to Lakshmi, the Hindu goddess of abundance, fertility and prosperity. They mark births and other significant events, holy festivals, changes in season; in some areas of the south, women paint new ones every day. The art is born of necessity; houses in rural India are primarily made of mud, which must be reapplied from time to time to prevent cracking. The fresh layer of wet mud is a perfect canvas.

Each region has its own tradition. In Orissa, a relatively isolated state on the east coast, a bride's in-laws may judge her by her ability to produce pleasing designs; unmarried girls spend hours mastering their technique. In the southern state of Tamil Nadu, the tradition is so strong that Christians and Muslims also practice it, incorporating symbols of their religions (opposite). Elephants figure prominently in the paintings done for the annual festival of Divali in Uttar Pradesh.

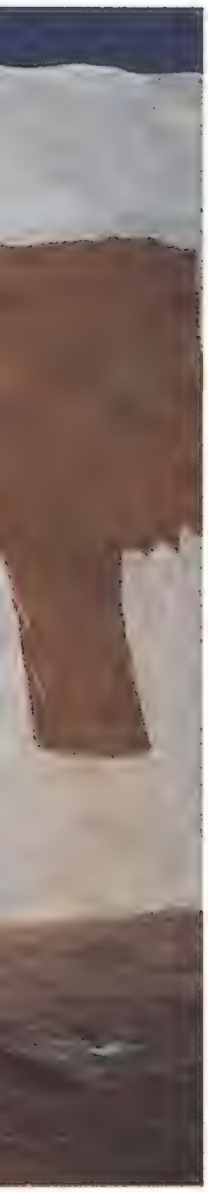
The art of the painted prayer may prove as ephemeral as the works themselves. In cities, mass-produced diagrams speed the process for women lacking time. Plastic pipes pierced with holes are filled with pigment and rolled to make uniform designs easily. Many women recognize the uncertain place of the paintings in modern, urban lifestyles. "When I go home to visit my family, then sometimes I will still make [them] with my mother," a woman living in Delhi explains. "But my daughter, she does not know this thing. She does not want to learn and so I am the last in my family to know it."

*Alison McLean*

Flower petals are the pigment for a diagram called an *athapoovidal* (left) made by several young women in Kerala, in southwestern India.

In the town of Ludiya, in Gujarat, many of the houses are painted pink (opposite), with designs that reflect the textiles produced in the area.

In the desert of western Rajasthan, scarcity of water means this woman can paint her house only once a year, for religious festival of Divali.



A nomadic woman has been hired to apply the bright blue paint that adorns the houses in the Brahman area of Jodhpur, Rajasthan (right).

The clay pot and coconut (right) are symbols of welcome. In Orissa, the paintings also honor arriving guests.

In Tamil Nadu, below the sacred rock of Thiruparamkundram, women perform the daily ritual.

A Brahman woman in Jodhpur accented her blue house with pink, green and floral designs (below).

A woman of Tamil Nadu finishes a design that took one hour to create; she will make a new one tomorrow.

*By Robert Wernick*

# In Melville's lifetime, fame proved fickle

*Yet,* Moby-Dick*'s creator believed that his great, and neglected, novel would endure for all time*

"Call me Ishmael." The words, prelude to the incantatory opening passages of *Moby-Dick*, ring out grave and clear. On a hot New England summer afternoon, a rangy, bearded fellow, one among a colorful crew of literary admirers, has come to pay homage to Herman Melville and to read his sonorous, spell-binding prose aloud. Each July 31, on the eve of the author's August 1 birthdate, Melville devotees gather at the Mystic Seaport Museum in Mystic, Connecticut, for a marathon rendition of his greatest novel. It is necessarily an all-night event: soon, the group will repair to the restored 1841 whaling bark *Charles W. Morgan*. Sprawled on the deck, some tucked into sleeping bags, they will all—a young woman with a sleeping infant, a high school history teacher—keep watch in the darkness, bearing witness to a great American epic.

Melville himself might have considered it a great cosmic joke to think that anyone would have stayed up all

By age 50, in 1870, Herman Melville earned a living as a customs clerk.

# 500 miles from nowhere, it'll give you a cold drink or a warm burger...

*NASA space flights inspired this portable fridge that outperforms conventional fridges, replaces the ice chest and alternates as a food warmer.*

*By Charles Anton*

Recognize the ice cooler in this picture? Surprisingly enough, there isn't one. What you see instead is a Koolatron, an invention that replaces the traditional ice cooler, and its many limitations, with a technology even more sophisticated than your home fridge. And far better suited to travel.

What's more, the innocent looking box before you is not only a refrigerator, it's also a food warmer.

**NASA inspired portable refrigerator.** Because of space travel's tough demands, scientists had to find something more dependable and less bulky than traditional refrigeration coils and compressors. Their research led them to discover a miraculous solid state component called the thermo-electric module.

Aside from a small fan, this electronic fridge has no moving parts to wear out or break down. It's not affected by tilting, jarring or vibration (situations that cause home fridges to fail). The governing module, no bigger than a matchbook, actually delivers the cooling power of a 10 pound block of ice.

**From satellites to station wagons.** Thermo-electric temperature control has now been proven with more than 25 years of use in some of the most rigorous space and laboratory applications. And Koolatron is the first manufacturer to make this technology available to families, fishermen, boaters, campers and hunters– in fact anyone on the move.

Home refrigeration has come a long way since the days of the ice box and the block of ice. But when we travel, we go back to the sloppy ice cooler with its soggy and sometimes spoiled food. No more! Now for the price of a good cooler and one or two seasons of buying ice, (or about five family restaurant meals), all the advantages of home cooling are available for you electronically and conveniently.

**Think about your last trip.** You just got away nicely on your long-awaited vacation. You're cruising comfortably in your car along a busy interstate with only a few rest stops or restaurants. You guessed it... the kids want to stop for a snack. But your Koolatron is stocked with fruit, sandwiches, cold drinks, fried chicken... fresh and cold. Everybody helps themselves and you have saved valuable vacation time and another expensive restaurant bill.

**Hot or cold.** With the switch of a plug, the Koolatron becomes a food warmer for a casserole, burger or baby's bottle. It can go up to 125 degrees.

And because there are no temperamental compressors or gasses, the Koolatron works perfectly under all circumstances, even upside down. Empty, the large model weighs only 12 pounds and the smaller one weighs just seven. Full, the large model holds up to 40 12-oz. cans and the smaller one holds six.

**Just load it up and plug it in.** On motor trips, plug your Koolatron into your cigarette lighter; it will use less power than a tail light. If you decide to carry it to a picnic place or a fishing hole, the Koolatron will hold its cooling capacity for 24 hours. If you leave it plugged into your battery with the engine off, it consumes only three amps of power.

**The refrigerator from outer space.**

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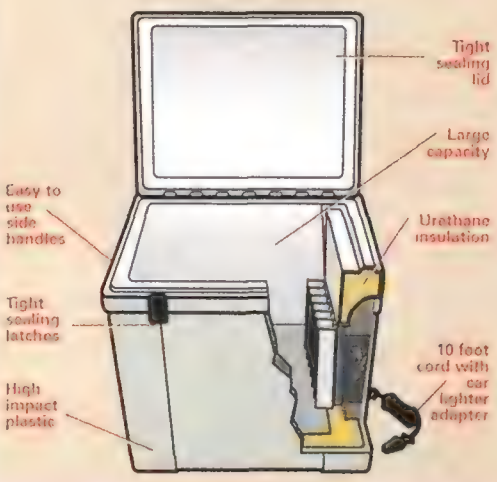


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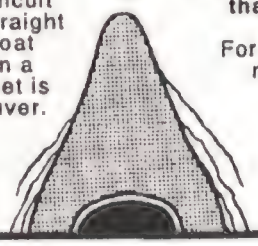

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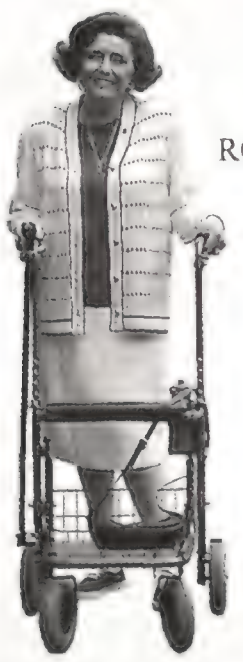

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In *Enchanted Island*, a 1958 film version of Melville's sensational first novel, *Typee*, Jane Powell and Dana Andrews re-created the author's South Seas idyll.

night on his account. He died more or less forgotten in 1891. *Moby-Dick*, published in 1851, wasn't recognized as a peerless masterpiece until around the 1920s. Since that restoration of his reputation was effected, Melville has attracted distinguished scholars in droves. The reading public soon will be able to open the pages of a commanding new biography, forthcoming from Hershel Parker of the University of Delaware. In Chicago, a collaborative project of the Newberry Library and Northwestern University is issuing the complete oeuvre, each text definitive and accompanied by erudite notes. (Thus far, the venture has been some 30 years in the making.) And if you're really smitten, you can join the Melville Society, a 650-member-strong consortium of academics and devoted readers.

Strangely enough, though, early on in his five decades as a writer, Melville was a sensation. His first novel appeared in 1846 and brought him instant recognition. *Typee: A Peep at Polynesian Life* was a largely autobiographical rendition of his interlude as a young sailor living with a tribe on the seductive island of Nuku Hiva.

Melville's exuberant rendition of his adventures in the Marquesas—and his portrait of an edenic refuge, remote from the whalebone-corsetted mores of Western society—won him an enormous following.

Readers couldn't get enough of him. At age 27, tall and bronzed and striding the streets of Boston, he became a 19th-century version of the matinee idol. In 1847, when he married Elizabeth Shaw, a daughter of Lemuel Shaw, the Chief Justice of Massachusetts, the location of the wedding had to be moved at the last minute. It was feared that throngs of besotted admirers—we would call them groupies—might disrupt the proceedings.

Yet this was also the man who would produce *Moby-Dick*, the ultimate odyssey into the heart of darkness. Both images of Melville are perfectly accurate, as far as they go. He could be jolly sailor or sardonic philosopher, morose hermit or the life of the party, by turns.

*Frequent contributor Robert Wernick has written on topics from the poet Pushkin to the painter Gauguin.*

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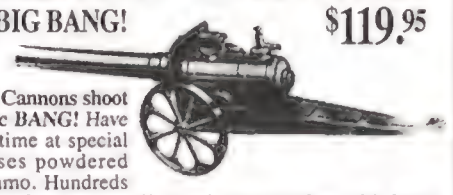

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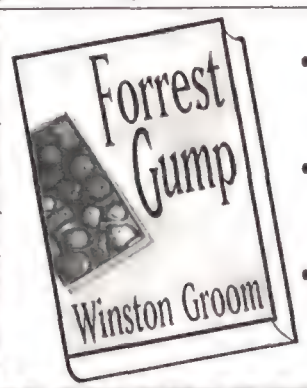


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It was only natural that there should be more of the bright side of his nature in the books he wrote during his five years of success, more of the dark and despairing during his 40 years of failure. But in fact his temperament was always mercurial, his nature volatile. He had a complex kind of charm, bringing to mind a passage from a novel by his fellow writer and friend Nathaniel Hawthorne: ". . . as for external polish, or mere courtesy of manner, he never possessed more than a tolerably well-educated bear; although, in his gentler moods, there was a tenderness in his voice, eyes, mouth, in his gesture, and every indescribable manifestation, which few men could resist, and no women."

The robust tales of his youth, *Typee, Omoo, Redburn, White-Jacket,* are written in a contagious convivial flow of language that convinces the reader that Melville must have had a whale of a time at sea. They are also packed with precise and passionate accounts of cruelty, oppression, misery and crime. The devil-may-care narrative breaks repeatedly into the speculations about reality and morality that were to vex him all his life, so much so that one Melville biographer, Lewis Mumford, saw nothing comic about including "Life, sinister meanings of, p. 124"

Melville's companion Toby Greene confirmed the essential truth of *Typee.*

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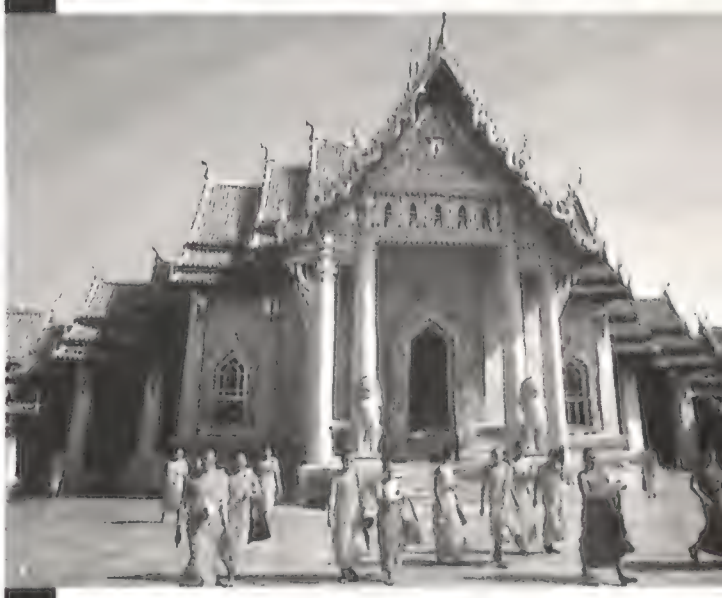

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among the entries in his book's index.

At one of the low points of Melville's life, in 1856, when his family thought he was on the verge of a breakdown and sent him on a four-month tour of Europe and the Middle East to help him regain balance, he visited old friends in New York before sailing. One of them describes him as coming "bursting fresh from his mountain charged to the muzzle with his sailor metaphysics and jargon of things unknowable," and reciting bawdy stories from *The Decameron.* A few weeks later, visiting Nathaniel Hawthorne in Liverpool, he told him he had "pretty much made up his mind to be annihilated."

In his exalted moods he would have preferred to dwell in more spiritual worlds. He also loved daydreaming of naked Polynesian nymphs. He loved even more what he once described to Hawthorne as "ontological heroics over a bottle of brandy." This metaphysical bent would provide most of the material for his novel *Pierre, or the Ambiguities,* the theme of which has been summarized by a recent commentator as invoking "a radical dualism that inverts the absolute duration of Chronos and empties it of any existential 'measure' of relevance."

On the other hand, as an old sailor he always knew enough to keep his feet fixed on something firm. Even if it was only a slender spar a hundred feet above the stormy ocean, he made sure to know all about spars. A great deal of the reality of everyday life, its peculiarities and its problems, drifts through the excitement of Melville's prose. Often his mid-19th-century America feels as if it would fit into late 20th-century TV talk shows.

"The House-top," one of his most powerful Civil War poems, visits a battlefield that turns out to be not the woodlands of Northern Virginia but the "roofy desert" of Lower Manhattan, where the Irish underclass of New York, angry at being drafted to fight Mr. Lincoln's war, is staging, against blacks, the first major American urban race riot. The young hero of *Typee* and

Elizabeth Shaw, a Boston jurist's daughter, married Melville in 1847.

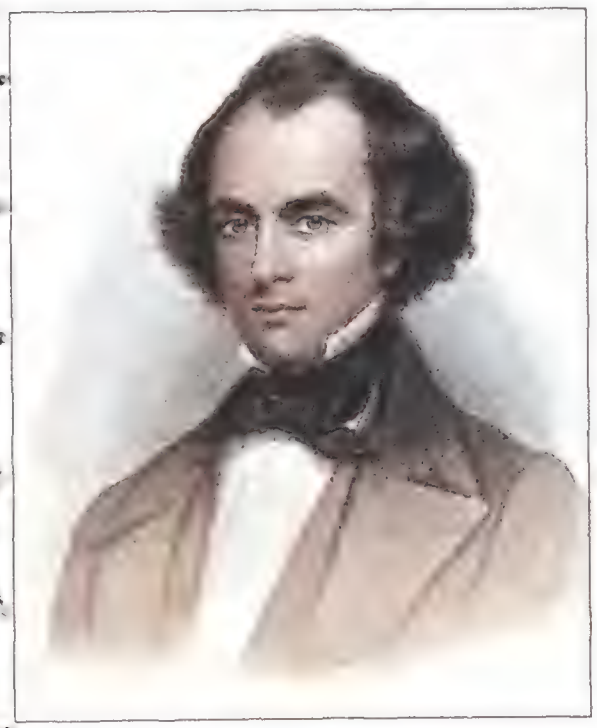
*Omoo* observes at firsthand, and provides an accurate documentary account of, the clash of the expanding Western world with pre-industrial societies. And the narrator of *Redburn,* an American sailor who arrives in Britain, sees a homeless woman dying of starvation in the streets of Liverpool and the shipboard misery of immigrants fleeing the primitive horrors of Ireland. The lawclerk in the story "Bartleby the Scrivener," who would "prefer not to" copy the papers his boss passes to him, could be seen as the first recorded American dropout. And a much more radically consistent one than his followers of today, since he allows himself to starve to death rather than lift one little finger to help this abominable world keep going round.

Melville repeatedly emphasized the fact that he, who had passed years "twixt the whale's black flukes and the white shark's fin," had a firmer grip on real life than his distinguished contemporaries. When he found Emerson benignly remarking that storms were just as beneficial to the sailor's health as calms, he scrawled in the margin, "To one who has weathered Cape Horn as a common sailor, what stuff all this is."

Melville was certainly not a man who, given his lineage, was marked for the rough company of life at sea. He was born into a prosperous New York family that traced proud genealogical lines to the noble family of Melvill of Scotland and the Gansevoorts, Dutch patroons who had ruled immense feudal manors along the Hudson River. Both of his grandfathers had been heroes of the American Revolution: Maj. Thomas Melvill, painted like a Mohawk, had been one of the ringleaders of the Boston Tea Party. Gen. Peter Gansevoort had successfully defended Fort Stanwix at one of the turning points of the Revolution.

Herman, the second boy among eight children, was considered rather dull—fit perhaps to be a competent clerk or surveyor—compared with his elder brother, the dashing, brilliant Gansevoort, their mother's darling. The two boys were rudely thrust into the adult world when their father suddenly went bankrupt and died in delirium. Herman was 12, his brother, 17.

Gansevoort showed flashes of brilliance, but like his father, made a mess of the family business and died young, victim of an unexplained illness. This tragedy may have served Herman later as an outline of the career of the hero of *Pierre*.



Friend Nathaniel Hawthorne saw *Moby-Dick* as a true masterpiece.

The younger brother, finding few jobs to his liking or even available in the long depression of the 1830s, went off to sea, shipping before the mast at first in a passenger ship to England, later in a whaler. The second was a daring if not a desperate step, for a whaleship might stay away from home for years, providing a dangerous and uncomfortable home for a crew largely made up of outcasts and ruffians, diseased and lawless alcoholics half of whom deserted on the average voyage, to be replaced by drifters on the beaches of the South Seas.

What began as a whaling voyage lasted almost four years, most of it spent out of sight of land. The boy learned how to deal with all the daggers and brutalities, and became an accomplished seaman, as handy at scrambling in the rigging as at pulling his oar in the flimsy boats that chased the whales. There was no lack of incident in those four years. He deserted from one ship, and reportedly led a mutiny on another. He lived among cannibals in the Marquesas, beach-combed in Hawaii and returned home as a seaman aboard a frigate of the U.S. Navy.

He made friends wherever he went. On board the warship, his eager mind was stimulated by meeting some aspiring young poets and one memorable character by the name of Jack Chase, a British tar who could recite from memory cantos of Byron. There was also a well-stocked library on board, where the young Melville, always a voracious reader, gobbled down information and continued that passionate love affair with words that lasted all his life.

Fortunately for all of us taken with Melville's voice, and his times, it turns out that even more of his words than we had imagined have come to light. Only 12 years ago, in 1983, a remarkable cache of Melville family letters and papers was discovered, stored away and forgotten in a barn in upstate New York. That astounding find, now in the collection of the New York Public Library, contains hundreds of letters written by the extended family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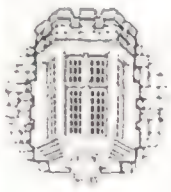

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and a few by Melville himself. From this correspondence, scholars are piecing together a much more intimate portrait of Melville's life within his large family—many of whom lived with him over long periods.

The Augusta Papers, as they have come to be called (after one of Melville's sisters, who originally owned, catalogued and preserved the documents), include one extraordinary portion of manuscript: some 30 pages of the original draft of *Typee*—until then, only a few fragmentary pages in Melville's own hand were known to survive. It is a kind of talisman, a symbol of a shining moment in the author's life when everything seemed possible.

When he stepped ashore in New York, fresh from his sea voyages in 1844, he was a sturdy, good-looking fellow of 25, reserved in manner, bubbling with energy, and with a huge stock of marvelous stories to tell. He told them so well to family and friends that they suggested he write them down. A few weeks later he had dashed off *Typee*, and shortly after, he woke up to find himself a household name.

By the time he was 30, in 1850, he had written five books, was a luminary of American letters, had married his sweetheart, Lizzie Shaw, had begun raising a family of bonny children, was living on a farm he loved in the Berkshires with a mountain he loved looming over it and was working on a new book. People who saw him bounding over the rocks when he went on outings with his literary friends, the champagne corks popping, must have thought he was on top of the world.

The new book was to be called *The Whale*, the title under which it was published in England. In America it became *Moby-Dick*. It apparently started out as a lighthearted, action-packed account of his life at sea, this time exploiting the only episode he had not yet used, his whaling days. As he wrote, the book exploded under him. Working almost ceaselessly for more than a year, in a state of creative frenzy, he wrote for the first time a book that was


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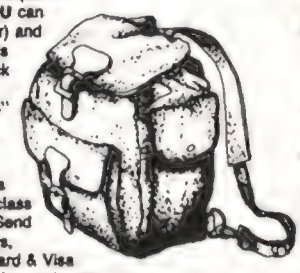

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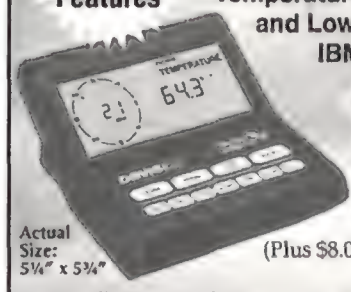

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At Arrowhead, his beloved Berkshires farm, Melville created *Moby-Dick*. Consumed by the whaling novel, he wrote several hours a day for 17 months.

just what he wanted to write. It combined his wildest imagination and his most solid grasp of fact, for once in perfect fusion.

There were some outside influences that helped make it a magic year and a magic book. He had read Shakespeare carefully for the first time, all drained down at once. He had read a book by Nathaniel Hawthorne, in whom he recognized a spirit equal to his own. And then he discovered that Hawthorne was living six miles down the road from him, in Lenox. For a few months the shy, reclusive, middle-aged author of *The Scarlet Letter* and the young, "tolerably well-educated bear" enjoyed one of the most intense and fruitful friendships in literary history. Sophia Hawthorne sat as a fascinated bystander while she watched Melville "dash his tumultuous waves of thought up against Mr. Hawthorne's great, genial, comprehending silences."

Out of the emotional and intellectual turmoil of his 30th year came Captain Ahab, one of the titanic figures of literature, the crazed Nantucket sea captain who leads himself and his ship and his crew of 30 men to death in the chase of a white whale that once bit off one of his legs and has come to be the incarnation of all the malevolence in the Universe. Stripped to its anecdotal skeleton, the story of Ahab and the whale would make a deliciously disquieting tale by Poe or movie by Hitchcock. In fact, it did become a film by Huston—but actor Gregory Peck never seemed to summon up the demented grandeur we expect of Ahab.

Ahab himself is the standard Romantic hero who defies the laws of God and Man and probability to stand alone against the marshaled forces of Fate. He differs, however, from almost all other figurations of this hero, from Lord Byron to Arnold Schwarzenegger: he has a job. He puts in a full working day, he is a functioning figure in the world of practical dollars-and-cents routine. There is even a Mrs. Ahab back home in Massachusetts, though the author wisely avoids going into domestic details. The life of a woman married to this captain must have contained depths of horror that no mere man like Herman Melville could hope to sound.

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think of whaling as a picturesque feature of an artsy-craftsy past. In fact, whaling was a brutal but essential fact of life, as central an industry as silicon chip manufacture is today. Throughout history, life came to a standstill at nightfall, except for people rich enough to light their homes with handmade candles. In the first half of the 19th century, before anyone had begun exploiting petroleum, whale oil was an economical, mass-produced commodity, conferring light on any old factory or office or home after the sun went down.

The production of whale oil was largely the creation of the whalers of America, who—as noted in Chapter 24 of *Moby-Dick*, "The Advocate"—outnumber "all the rest of the banded whalemen of the world, sail a navy of upwards of seven hundred vessels, manned by 18 thousand men; every year importing into our harbors a well-reaped harvest of $7,000,000."

A good quarter of the book's 135 chapters are devoted to descriptions of how a whale ship operated, the endless days on the empty ocean, the constant dangers of storm and sunken reef and monsters of the deep, the wild excitement of the hunt, the fury of the kill, the highly skilled factory work that follows when the carcass is cut up and the oil extracted from the blubber in furnaces that smell of the "left wing of the day of judgment."

Many readers are tempted to skim over these chapters. In doing so, they miss such fascinating information as how the skin of the whale's penis, "longer than a Kentuckian is tall," is made into a garment for the mincer, the man who is under standing orders to slice the blubber into strips that fall as fast as sheets from an orator's desk.

The chapters are also a vital part of the book's structure. It is all that mass of down-to-earth detail, the daily labors and the daily perils, that gives dimension and dignity to the voyage of a collection of common seamen and a lunatic captain. They become epic characters, and caught up in the epic flow, readers find it just as natural for magnificent Elizabethan rhetoric to be spouted by a 19th-century Nantucketer as by an 11th-century Scottish warlord like Macbeth.

Wide-ranging works like *Macbeth* or *Moby-Dick* invite wide-ranging interpretations. Captain Ahab has had more than his share of them. Ingenious and more or less convincing claims have been made that he symbolizes the Puritan tradition of New England, white male imperialism, Man defying Fate, the United States of America, Free Will defying Predestination, the Ego vainly trying to dominate the Id, as well as the author's revenge on the father who abandoned him, like Ishmael in the Bible, at a tender age. He can carry all this symbolic weight because he remains a live human being. In a climactic chase scene, he throws his lance with well-trained arm, resolved to sink "to the socket, as if sucked into a morass," through the mighty whale's flesh.

Melville was physically and emotionally exhausted when he finished *Moby-Dick*. But the notion that he went to pieces because of the book's lack of recognition is not strictly accurate. *Moby-Dick* got some favorable reviews,

Rockwell Kent rendered the peglegged Ahab for the 1930 *Moby-Dick* edition.

In John Huston's classic *Moby-Dick* (1956) Gregory Peck portrayed Ahab.

sold fairly well, remained in print for years, and brought in modest royalties. Still, his masterpiece was, on the whole, consigned to obscurity.

It is true that everything after *Moby-Dick* went downhill for Melville. He threw himself with his old violence into a new book, which he fondly believed would be a popular romance with enough passionate hearts and mysteries palpitating behind dark veils to please the ladies. What he turned out was *Pierre*, a thick stew of incest, murder, suicide and ontological heroics that the critics found easy to laugh at and no one cared to buy.

"It is my earnest desire," he wrote half-jokingly to his father-in-law, "to write those sort of books which are said to 'fail.'" He had run out of material for popular novels. He had exhausted all his sea adventures, and he had nothing on land to replace them. Life on land consisted of trying to make money by spending all day at his desk in a household that might contain, at a given time, a wife, a mother, a brother, a sister-in-law, four babies and four spinster sisters. "Dollars damn me," he once said, and he could never make ends wholly meet without help from his wife's generous relatives.

He tried to make some cash by going on the lecture circuit. He had nothing of the showman in his personality, and audiences paid only tepid attention to his remarks on the statuary of ancient Rome. His relatives tried hard to get him a post in the diplomatic service. His friend Hawthorne wrote a campaign biography for his college chum Franklin Pierce, and when Pierce was elected President, was richly rewarded by being named U.S. Consul in Liverpool. Melville had done no political chores and was passed over. Finally, in December 1866, at the age of 47, he got a job as customs inspector in the Port of New York, and for the next 19 years worked faithfully to earn his $4 a day. He never complained, but he could hardly keep from reflecting that Hawthorne, who had done his own miserable stint in the customhouses of Massachusetts, had gone on to international fame.

His wife, Lizzie, was ever steadfast. She faithfully copied out his unruly handwriting and at one time thought he was going insane from overwork and disappointment. New documentary evidence suggests that the blackness of his moods made her life at times hellish indeed. She once resolved to leave him but never acted on her intentions.

His oldest son, Malcolm, who loved to play with guns, blew out his brains in his locked bedroom one morning. His second son, Stanwix, turned drifter and died a miserable lonely death in San Francisco. One by one, his friends and family dropped away. His robust health failed. When he walked to the docks at the foot of Gansevoort Street to inspect incoming cargoes, no one had the slightest idea, as he wrote sadly in a letter, that the street was named for his grandfather, the hero of Fort Stanwix. He was more and more conscious of being a relic from the past, as when a New York paper ran a story saying, "There are more people who believe Herman Melville dead than there are those who know he is living."

He in fact survived for 40 years after *Moby-Dick*, and it must have taken more courage to live those years out than to run a flimsy boat alongside an infuriated whale. He lived a quiet fam-

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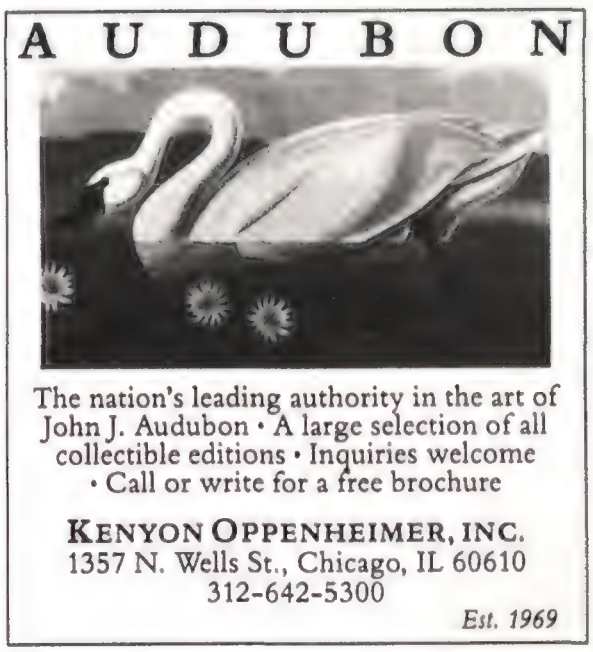
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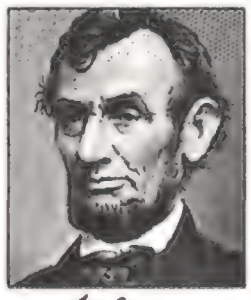

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ily life in comfortable quarters in downtown Manhattan. His grandchildren adored him. He went every day to the docks, which gave him some of the outdoor exercise he needed. At that time, it was considered natural for customs inspectors to accept gratuities from importers who wanted them to look the other way when goods were unloaded. Melville always punctiliously returned the coins that had been slipped into his pocket by these charitable importers.

He always remembered that he was an heir of Melvills and Gansevoorts, and his view of the body politic was fairly conservative. He hated materialism and progress, admired the principles of the Declaration of Independence but doubted that they could work in practice. His ideal society, as sketched in his poem "The Age of the Antonines," was the early Roman Empire, when "a pagan gentleman reigned," when everyone knew his place, there were no demagogues or parvenus, and honor counted for more than money.

In his late, great poem "Clarel" a bluff ex-sailor named Rolfe ventures to suggest that American democracy may be able to avoid the internal conflicts that destroyed all past civilizations. An ex-Confederate soldier named Unger, who, according to literary critic Helen Vendler, presents "Melville's truest insights into the human condition," replies that America is a mass of "slumberous combustibles sure to explode." Looking out on the America of the post-Civil War days, with its racial conflicts, industrial strife, crime-ridden inner cities, unchecked corruption in Washington, unchecked greed on Wall Street, uncontrolled immigration and growing gap between rich and poor, Melville had every reason to be pessimistic about his country's future.

Peter Ustinov scripted, directed, played Captain Vere in *Billy Budd.*

In spite of it all, he went on writing. He wrote nine books after *Moby-Dick*, each of them extraordinary in its way.

Immediately after the chaotic extravagances of *Pierre* he turned to the spare, brooding, accurate prose of his great short stories, "Bartleby," "Benito Cereno," "The Encantadas." Then he switched abruptly back to the lively rakehell style of his first books with *Israel Potter, His Fifty Years of Exile.* This neglected masterpiece—recently reissued by Fordham University Press—is a reworking of the crude autobiography of the real Israel Potter, veteran of Bunker Hill and American spy in England during the Revolution. Melville must have found in Potter's life a parallel to his own: a few years of action-packed adventure followed by long years of neglect and silence. Poor Israel suffers almost every indignity, from being denied a bottle of brandy by Benjamin Franklin to spending months of misery slaving in a brickyard, the gloomiest of lives told with the most sparkling verve.

After *Potter* came *The Confidence-Man: His Masquerade,* a novel that is really a long, bleak, brilliantly written tract to demonstrate that nobody and nothing on Earth can be trusted. Not unnaturally, very few people bothered to buy it. He was ready to give up on readers. "Herman is pretty well and very busy," Lizzie once wrote to her stepmother, "pray do not mention to any one that he is writing poetry—you know how such things are spread."

He wrote poetry for some 30 years,

Tragedy struck when son Malcolm, 18, fatally wounded himself with a gun.

painfully instructing himself in the art of verse, experimenting boldly and awkwardly with meters and stanzaic forms, producing a body of work that was, in general, either derided or totally ignored by his contemporaries. It has been increasingly admired in the 20th century, and he is now counted among America's major poets. He felt, because of a revival of interest in his work in England, that he would be appreciated after his death. He compared himself to the century plant which, when it flowers after a hundred years, can afford a moment of pity for the generations of haughty roses, now dead, that once thought of the plant as merely a weed.

Near the end year of his life, he went back to novel writing. As always, he started off with a real-life incident. A half-century before, his cousin Guert Gansevoort, serving in peacetime aboard the USS *Somers* in Caribbean waters, had headed a court-martial.


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The accused were three young sailors who had been overheard concocting a harebrained scheme to start a mutiny and turn pirate. It may have been a childish prank, but the ship's captain took it very seriously, and all three were condemned and hanged. A tremendous scandal ensued, not least because one of the sailors was the son of the Secretary of War. Lieutenant Gansevoort was widely attacked for having rushed too hastily to a judgment that was much too cruel, and though the Navy cleared him of any wrongdoing, he passed the rest of his life under a cloud of ignominy.

As Melville finally reworked the story, it became a vehicle for his final comment on the tragic complexity of human events. He moves the scene to the Royal Navy of the 1790s, and he makes his hero a merchant seaman wrongfully impressed onto a British warship but loyally doing his best to serve his new master. Billy Budd, known as the "Handsome Sailor," strong and cheerful, everybody's favorite, might be the Herman Melville who had shipped out for the South Seas long ago. One day he is summoned to the captain's cabin. He is falsely accused of conspiring to mutiny. He strikes out blindly at his accuser and kills him with one blow. Captain Vere recognizes that the act was wholly unpremeditated, that the real villain is the man lying dead on his cabin floor, and all his humanity argues for showing some mercy to the unfortunate boy. But he also knows that there is a war on, that his *Bellipotent* is one of the thin line of ships that is all that stands between England and invasion. The Royal Navy has just been wracked by two major mutinies that threatened to destroy it. Any breach of discipline now might bring disaster. So the Articles of War must be carried out to the letter, and Billy Budd, guilty of killing a shipmate, must hang.

Many of Melville's modern critics have expressed displeasure with his coming down so flatly for law and order. As he might gently remind them, few if any of them have had to exercise command in wartime. On April 19, 1891, he wrote the last line of the poem that concludes the book, the last words of Billy Budd as he waits for sunrise and death: "roll me over fair, / I am sleepy, and oozy weeds about me twist."

In August Melville organized his last book of poems and titled it *Weeds & Wildings*. He added a tender dedication to his wife, reminding her of a four-leaf clover he had picked "by the wayside on the early forenoon of the fourth day of a certain bridal month, now four years more than four times ten years ago."

He died on September 28, quite forgotten by most of the world. A *New York Times* editorial writer, assigned to write an obituary notice, called him "Henry Melville."

Melville particularly admired this 1834 French aquatint: "A noble Sperm Whale," wrote *Moby-Dick*'s author, "is depicted in full majesty of might."

# Book Reviews

*Measure for Measure:*
*A Musical History of Science*
Thomas Levenson
Simon & Schuster, $25

Science and music both need instruments. From this common thread, Thomas Levenson weaves a fascinating tapestry, a colorful panorama of scientific and musical development over three millennia, from Pythagoras and the alchemists' workshops to Yo Yo Ma and the Media Lab at MIT. Despite its scope, this is no dry tome of purely academic interest; it is full of wonderful stories, biographical sketches and accounts of how things work. Levenson is so curious and enthusiastic about his subjects that he excites a reader's interest, whether telling us how Ktesibios of Alexandria built the first organ around 270 B.C.—he adapted a brass water pump he'd invented to put out fires—or why computers, no matter how powerful, will never be able to predict the weather beyond next month.

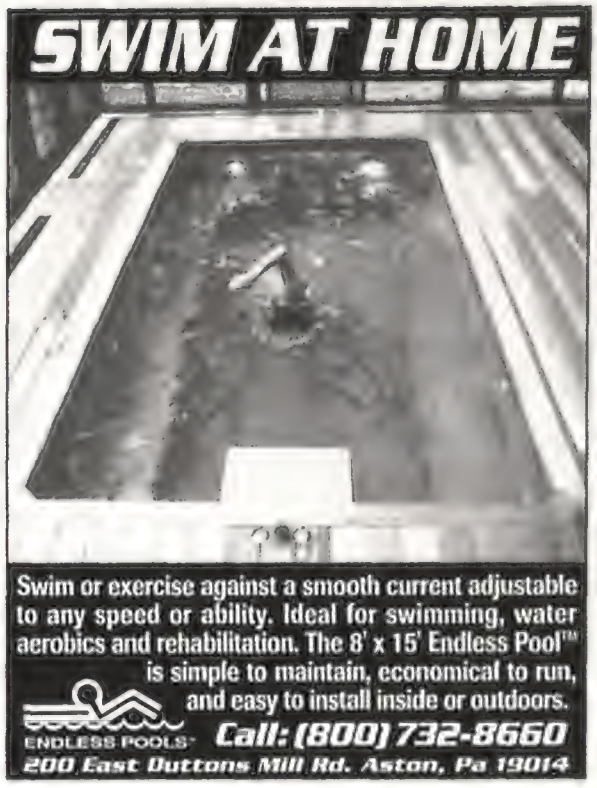
This is an eclectic history, more subjective than comprehensive, aimed more at showing how scientists and composers think about their pursuits than at cataloguing their works. It is filled with anecdote, obscure detail, curious digression, giving a sense of how history really happens. Of the history of eyeglasses, for instance, we learn that "Petrarch acquired his pair in the last decade of his life, sometime in the mid 1360s." But 14th-century men of science, devoted to revealing God through observation of nature, were suspicious: "Sometimes, given poorly made lenses, eyeglasses would distort shapes, or change the colors an unaided eye would detect. The conclusion was obvious: eyeglasses deceive the eye and degrade the central function of vision—to see the truth directly. Such trickery belonged to conjurers, not to those whose business it was to trace the evidence of the divine through science."

The use of science to know the true, or divine, order of things can be traced to Pythagoras in the sixth century B.C. "The discovery that transfixed the Pythagoreans was that the octave and other intervals that like the octave sounded harmonious and smooth occurred not simply by chance but as if by design. Pythagoras was credited in antiquity with the realization that there was a deep connection between mathematics, numbers and sound: he discovered that the fundamental intervals in music were created by the perfect ratios of the lengths of string or pipe used to generate the notes." In this observation the Greeks saw a universe, describing the orderly movements of the planets in numbers that became "the music of the spheres." "The Pythagoreans were not scientists; they sought magic in numbers," Levenson writes. "But still, here is where science begins."

Before emerging in anything like its modern form, science was shaped by the philosophy of Aristotle, the occult rules of alchemy, and the authority of the church. Levenson sees modern science emerging in the mid-13th century, in Paris, where an Oxford-educated Franciscan, Roger Bacon, posited that questions about nature could be answered by observation, not only by recourse to the Bible. If one wanted to know, for example, whether both parts of a grafted plant retain their individual souls, one could conclude that they do by looking at the fruits they bear. "Bacon's inspiration was to recognize that knowledge of God could be found within the book of nature," Levenson writes.

Bacon studied optics and made some small magnifying lenses of glass droplets, but it took several centuries before Galileo's telescope and Leeuwenhoek's microscope shattered the old ways of seeing. While Galileo's use of the telescope to find new facts in nature brought down the wrath of the church in Rome, Leeuwenhoek was born in the more tolerant Netherlands in the same year (1632) that the Inquisition tried and condemned Galileo.

Leeuwenhoek's investigations of the unseen microscopic world redefined the nature of truth. "The medieval eye,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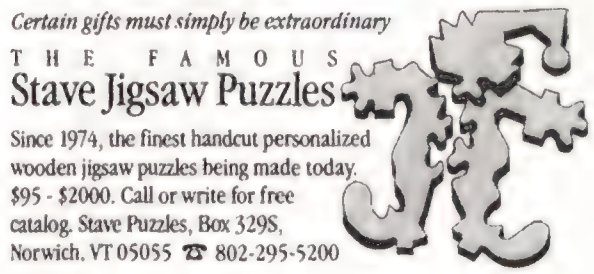
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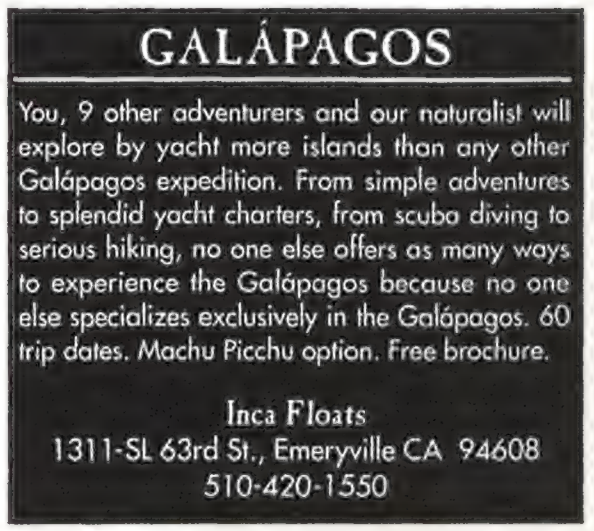
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Roger Bacon's eye, was passive," Levenson writes. "Bacon looked at what passed before his eyes and stopped when he had seen enough to recognize the hand of God in nature." Leeuwenhoek became an experimentalist as well as an observer, entering actively into the world his instrument exposed.

With Isaac Newton, the scientist's search for order in nature reached new heights. With a set of mathematically expressed Laws of Nature, Newton could survey the Universe and hope to see the design of God, the "First Cause." But, as Levenson points out, Newton's God was to be found *in* nature and its laws, not any longer *through* them, and this brought about a profound change in science itself: "Medieval men could stop when they had achieved their object, when they had seen enough. The new, modern kind of scientist had no such luck; [this science] . . . required them to continue to seek new evidence that would confirm or disprove their ideas . . . with no end in sight."

Newton and his contemporaries had achieved a method of knowing nature that seemed elegant and certain. In music, this sense of order was brought to perfection in the works of Johann Sebastian Bach. But just as the 19th century would replace Bach's sublime order with Beethoven's clashing harmonies and discords, the certainty of Newton's order was to give way to a new mathematics and science of uncertainty, quantum theory and chaos.

The scope of change is shown by Levenson in two revealing anecdotes. Early in the 19th century, the French astronomer Pierre Simon de Laplace predicted that science would "embrace in the same formula the movements of the greatest bodies of the universe and those of the lightest atom." And when asked by Napoleon why he had left God out of his equations, Laplace responded, "I have no need of that hypothesis." But by the end of the century, the French mathematician Henri Poincaré would conclude, "Not only science cannot teach us the nature of things, but nothing is capable of teaching it to us, and if any god knew it, he could not find the words to express it."

Poincaré had earned the right to say this, as it were, by proving mathematically that Newton's equations for planetary motion, while they worked for Earth and Moon (which was as far as Newton took them) could never work for even three celestial bodies, let alone the whole planetary system. "We cannot know all the facts," Poincaré argued, "and it is necessary to choose those which are worthy of being known."

Scientists and composers of music alike, Levenson says, are still engaged in the Pythagorean search for abstract order—whether scientifically discovered in nature or invented by the composer's mind. There has seemed to be a great difference between these kinds of order, between discovery and invention, reality and imagination, truth and beauty. But the heart of Levenson's story is the slow and steady erosion, since Newton, of this clear distinction.

Poincaré's words were soon followed by a recognition among this century's physicists and philosophers that nature's secrets were only selectively—and subjectively—available to us. Einstein's relativity tied knowledge to an observer's particular perspective. Heisenberg's uncertainty principle showed that one could never know both the position and the velocity of an atomic particle, for in measuring one you altered the other. Similarly, it was found that light appears as a wave or a particle depending on how it is measured.

All of this, Levenson suggests, was implicit in the early triumphs of Galileo and Leeuwenhoek. "Telescopes and microscopes," he writes, "do not simply extend human sight. They narrow it, confining the field of view. Leeuwenhoek, squinting at the microbes swimming in the water at Berkelse Mere, could see a city in a single drop, but not the pond itself."

Ultimately, this kind of observation leads to a vanishing point, the point where we can't know everything and must choose what's worth knowing. And here Levenson sees the deepest connection between science and music. The test of a piece of music is its beauty; in a universe where truth depends on our choice of facts, this may also be the best test of a scientific theory.

To Einstein, Levenson reports, a theory could be too beautiful to be false: Einstein's most famous epigram was prompted by the question of what he would do if the measurements of bending starlight at the 1919 eclipse contradicted his general theory of relativity. He said, "Then I would feel sorry for the good Lord. The theory is correct."

*Paul Trachtman* is a freelance writer based in rural New Mexico.

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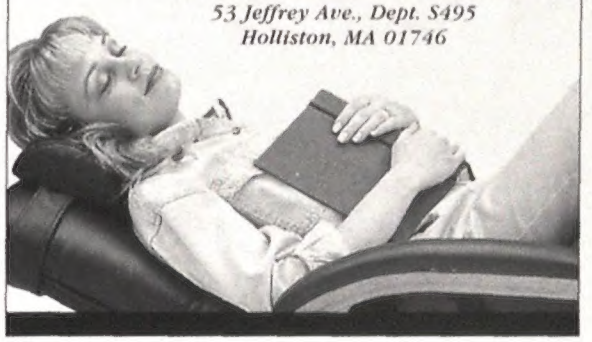


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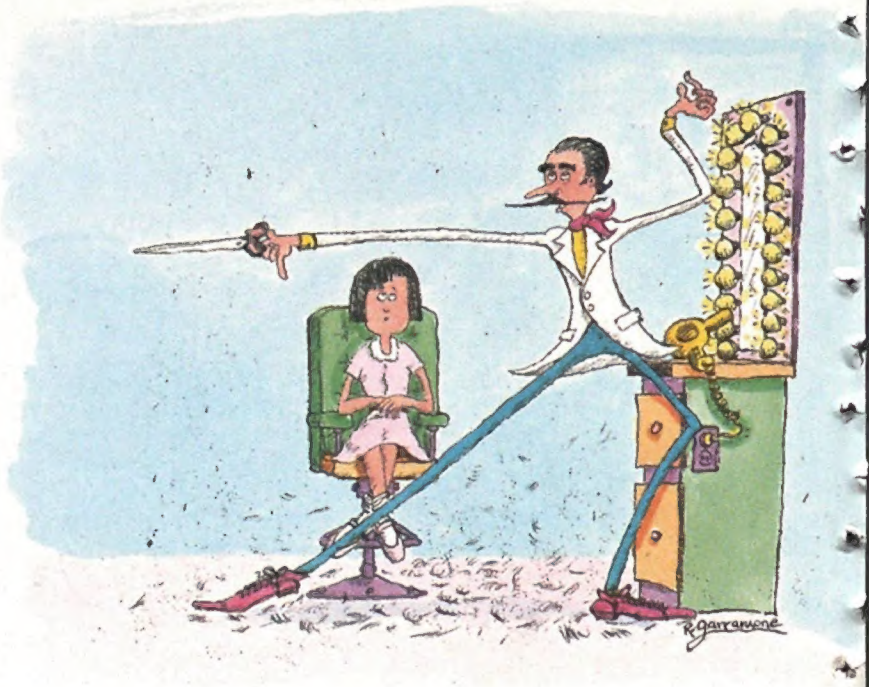
*By Edith Pearlman*

# *En garde! Maybe M. Emile was a lousy hairdresser, but he gave his place tone*



M. Emile was tall and thin, with sparse, pomaded hair. He had traded his upper lip for a little awning of a mustache. He had the incurious gaze of a museum guard. Between clients he took off his white jacket and brushed it hard, as if it had offended him.

M. Emile's accented English was serviceable, but he didn't use it much. I too kept my mouth shut. I was 10 when I was first brought to M. Emile; in two years of monthly visits, I said nothing to him but "*Merci.*"

M. Emile didn't address me at all. He merely extended his palm to my mother, waiting beside me on a folding seat. I climbed onto the client's chair and my mother brought her seat near. M. Emile regarded my head.

My hair was dark brown. I wore it in a Dutch cut—sides and back and bangs ferociously straight.

M. Emile picked up a clean pair of scissors. He held it at arm's length. *En garde!* I thought. He bent his elbow and began to cut. *Touché.* I was learning French in "Enrichment" class.

M. Emile snipped. He executed a *coup de grâce.* I blinked through the mirror at my abbreviated Dutch cut. After certain sessions it was particularly uneven. Sometimes what remained of the bangs slanted like a roof.

My mother sighed, just a little.

You may wonder why we continued to patronize M. Emile.

The answer: M. Emile was European.

To my mother, the post-World War II Europeans trickling into town were heroic and wise. The newcomers, many sponsored by the local Committee to Aid Refugees, included my Viennese friend Tanya and her parents (Tanya was in Enrichment too). Also two Czech brothers starting a jewelry business. Also the Armands—*Maman* and three daughters—who lived in a little flat. All four dressed gorgeously on no money; they drank wine and laughed and listened to recordings of great tenors.

My mother liked Tanya; she invited the Czechs to dinner; late on Saturday afternoons she tottered blissfully home from the Armands. And she rushed to patronize the new French hairdresser, whose backing, like that of the Czech jewelers, had been supplied by the Committee to Aid Refugees.

My mother wore her own hair in a shoulder-length bob. The ends waved naturally. The hair was parted on the side and clasped in a barrette. Even M. Emile could not damage this style—or, if he did, the harm could be repaired at home. But a straight curtain of hair like mine showed every flaw in the artisan's technique. While M. Emile set about exposing my ears, the right more than the left, my mother's eyes told us both that she respected the hairdresser's valor. When he said "The child is finished," my mother's shoulders lifted in a shrug that might have indicated disappointment. But M. Emile and I knew what it meant: beauticians were a dime a dozen; brave Frenchmen were to be cherished like Caruso recordings.

The months went by. My mother and I and a few nearsighted old ladies continued to take our business to M. Emile; the rest of the neighborhood, on one pretext or another, made appointments with his two talented assistants, Mollie and Nora. M. Emile gave them the same remote courtesy he awarded his customers. They grinned tolerantly and flicked suds at each other.

Meanwhile the Enrichment class yawned over Socratic dialogues. Also my skin started to break out. I grew two inches in one week. Overnight my hair became moist and limp.

"Hmmm," said M. Emile one day, cracking the conversational ice. "*Mon Dieu,*" he added. What a chatterbox.

"The hair of the *demoiselle* has a mind of its own." The stuff hung in weak spirals; the recent deployment of the scissors had resulted in strands of differing lengths. My mother fluttered; her daughter's hair was apparently both stubborn and incompetent.

But I was overjoyed. M. Emile had not referred to me as "the child." He had called me "the young lady." A young lady could make decisions for herself.

"*Merci,*" I said, meaning *Adieu.* "*Jamais plus!*" I said to my parents at dinner. "I'm going downtown to Ultra-Chic like everybody else. *Monsieur* may be French, but he's no *artiste*; and what makes you think he was a *maquisard*?" My mother murmured something into her coffee. "He looks like a collaborator to me," I went on. My father put up a warning hand, and I calmed down.

By the end of the year, Mollie and Nora were serving all the customers. M. Emile answered the telephone and collected money. No longer needing his white coat, he wore instead an ancient pinstriped suit. With his old-fashioned elegance, with his politeness uncomplicated by conversation, he gave the place tone. Then—after what must have been an odd courtship—he married one of Mollie's hennas and moved to Miami.

To this day I regret impugning M. Emile's patriotism. He wasn't a collaborator. But he wasn't a hairdresser either. He had probably worn a cutaway in the great hall of some provincial department store and kept an eye on the decorum of the salesladies. This resumé must have been a problem for him—the Refugee Committee was interested in entrepreneurs, not floorwalkers. His solution, if unheroic, was at least bold. "*Que faire*?" M. Emile might have said, if he had ever felt like talking.

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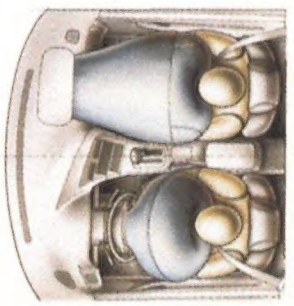

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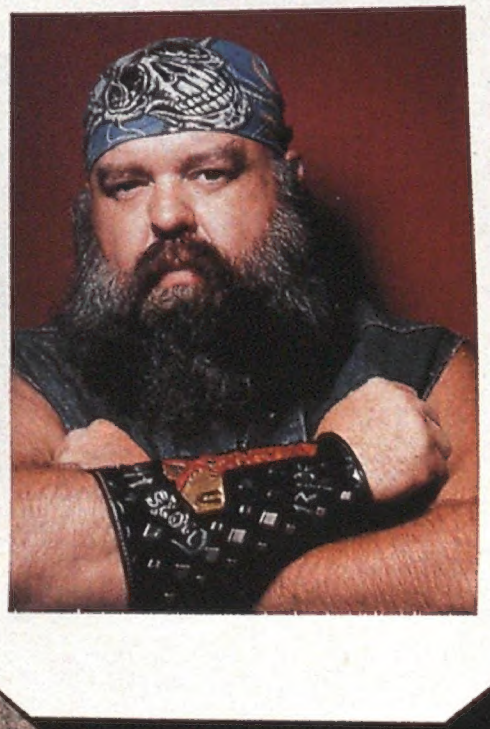

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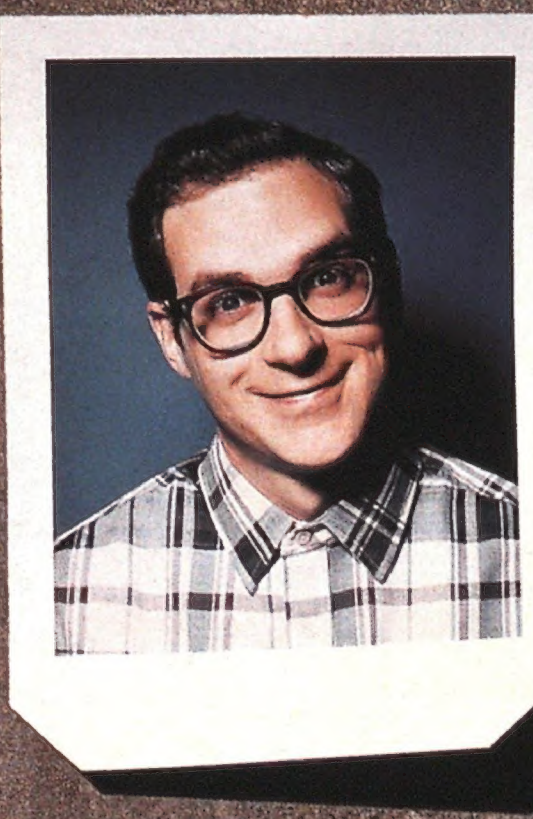

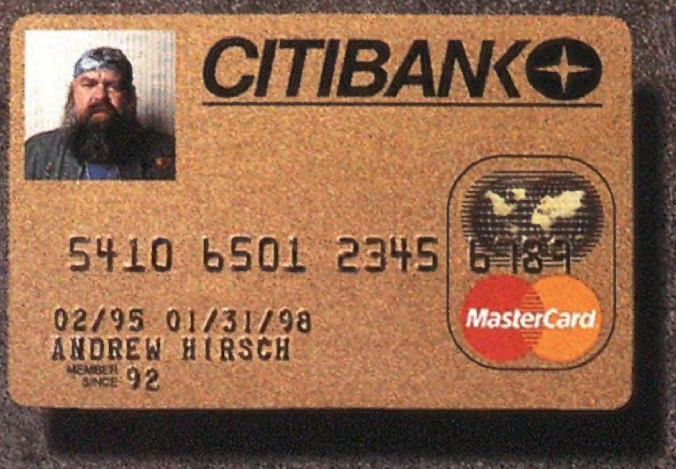


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